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AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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VENTILATION OF SEWERS.

The subject of a thorough ventilation of sewers, is attracting a good deal of attention from sanitary boards throughout the world. In London, where great necessity exists for preventing the escape of noxious gases and vapors into the air, a number of plans have been tried to effect the object, among which Dr. Stenhouse's charcoal filters have been subjected to test. We take the following description from the London *Builder*, which publishes elaborate drawings of the plans of ventilation, which, from want of space, we are obliged to omit.

In the construction of main sewers, it is of the utmost importance to provide for full, free, and unceasing ventilation at many points; and also, as far as is possible, to *disinfect* sewage gases before these escape into the street above the sewer. Some twenty or more years since, the London sewers were, for the first time, extensively and permanently ventilated, with, it must be confessed, great sanitary advantages to the residents in the metropolis. The London sewers are, however, unfortunately for the most part ventilated by vertical shafts *direct* from the sewer to the street; the ventilating grates allowing sewage gasses to escape direct into the open air above; street mud, ground macadam, sticks, straw, and any other material which will pass through the open spaces of the ventilating grate, falling down and tending to block the flow of sewage below. Some years since, Dr. John Stenhouse propose the use of charcoal as a disinfecting medium for sewage gases. Mr. Robert Rawlinson, sanitary commissioner in 1855, adopted charcoal at the suggestion of Dr. Stenhouse, in the British Hospitals on the Bosphorous, as also in the Crimea, and, subsequently, in various towns in England, on main sewers; as, at Worksop, at West Ham, at Brighton, at Winchester, at Windsor Castle, at Swansea, and at other places. Dr. Letheby, the City Officer of Health, and Mr. Wm. Haywood, the city engineer, have also used Dr. Stenhouse's mode of applying charcoal to disinfect sewage gases in the city sewers; and, as reported by these gentlemen, with advantage. There are difficulties on the city sewers peculiar to the city of London. The volume of sewage is vast, and the sewers are large, having flat inverts, with small falls. They have also to be cleansed by hand labor; any check, therefore, to the free flow of air to and from the sewers, to dilute the sewage gases, is attended with some danger, and the intervening of screens of fine charcoal *might* retard ventilation in a degree. The remedy is, however, to be found, not in abandoning a use of charcoal, which is so beneficial, but by increasing the area for ventilation, so as to compensate for any retardation of an escape of sewage gases by the ordinary openings. The following facts have been proved: Ordinary wood charcoal, broken small in grains like coffee beans, and placed in wire boxes, or trays, so as to "*screen*" the sewage gases, oxidises such gases as they pass through the charcoal. This effect is not evanescent, but is permanent, in a great degree. The charcoal abstracts oxygen from the atmosphere by its enormous area of pores, and combines this oxygen with the sewage gases in such manner as to produce a sort of slow combustion, or such recombination, as to render sewage gases comparatively innocent. Dilution in the air has a similar effect, but is not so rapid.

In main sewer ventilation, charcoal can be used at all ordinary manholes. A manhole-cover is placed over the vertical shaft above the sewer, which forms the street surface, and is air-tight, but movable. A side chamber is formed, over which to place the open ventilating grate, and a wire tray, to be filled three, four, or more inches deep with fine charcoal, is so placed that it will slide over the vertical shaft, and so cause all gases escaping from the sewer to pass through the charcoal when in action. The tray can be drawn or pushed back over the side chamber, when it is desirable to enter the sewer to examine, to cleanse, or to flush it. Such ventilating chambers, at some 300 feet to 500 feet intervals, are in use on the main sewers in West Ham, and in other places. The side-chamber is an advantageous arrangement, if there be no charcoal tray, in preventing dirt falling upon the sewer invert, and so impeding the sewage flow.

PEAT FOR FURNACE FUEL.

To the Editor of the London Colliery Guardian:

Perhaps for the manufacture of iron no fuel is more suitable than peat and peat charcoal; and charcoal iron is, generally, more valuable than that made with coal or coke. Peat charcoal contains vegetable carbon superior to that contained in oak. It is twenty per cent. more combustible, and has been found preferable to all other fuel for case-hardening iron, tempering steel, forging hor-e-shoes, and welding gun-barrels. It is eminently fitted for the smelting and preparatory processes of iron-making. On the Continent, peat charcoal has been long valued for these purposes, as it gives heat in the ratio of one and a half to seven of deal wood charcoal. The iron manufacturers at Moscow, Bohemia, Bavaria, and Germany, use peat largely, asserting that it may be utilized in every stage of the process—in calcining, at the blast furnace, the cupola, and in refining, puddling, annealing, &c. In addition, peat and iron ore generally lie in close neighborhood, so as to considerably reduce the cost of transit of the former. For steam-boilers also peat is preferable to coal, and that for the reason I have before given, namely, its superior steam-generating power, and the entire absence of all sulphurous vapor. Small coal and peat combined form a very economical fuel.

Notwithstanding this state of things, it is surprising that peat and peat charcoal are not more largely used. Charcoal pig-iron is but sparsely made in this country. English charcoal bar-iron is produced from pig-iron that has been manufactured by coke. At Sheffield, bar-iron is converted into steel by charcoal; and at the tin-plate works in England and Wales, charcoal again enters into extensive use. Now, what is to prevent peat taking the place of wood charcoal and coal and coke, in the above and other processes? 1st, Peat is plentiful, the deposits in Great Britain and Ireland occupying an area of six million acres. Say there is an average thickness of twelve feet, that would be three thousand five hundred tons to the acre, or an aggregate amount of twenty-one thousand million tons, *i. e.*, twenty-one million tons per annum for a thousand years. 2d, It is equal to wood charcoal for some purposes, and far superior to it for others. I have already advanced statements in support of this assertion. Peat is valuable as a fuel for generating steam, and in all processes for the manufacture of iron, manuring the land, deodorizing, &c. 3d, But it requires to be properly prepared. Peat in its normal condition contains from fifty to seventy-five per cent. of water. Air-dried peat still holds too much water; and hydraulic pressure seems to be the thing required, but the machinery has been, hitherto, too expensive, although a patented operation has lately been introduced, and formed the subject of an interesting paper read at the Society of Arts. The peat is thoroughly cut up and strained, made into moulded hard blocks, dried, and is fit for use. Four to five tons of peat from the bogs are thus condensed into one ton, at a total cost of 3s. 6d. It burns freely, is smokeless, with but little ash, is water-proof, and incapable of self-ignition. Two and a half to three tons of this prepared peat will make one ton of charcoal, at a cost of 14s., but in the conversion enough hydrocarbon or peat grease is produced nearly to cover the whole outlay.

These facts should lead our capitalists to investigate the qualities of peat and peat charcoal, in order to its wider use. It will save our coal-fields, be cheaper, often more suitable, produce better iron and steel, turn out good illuminating gases, and excellent lubricators, with thumping dividends to investors. The best machinery would soon follow capital, and thousands be employed in a comparatively new manufacture.

I remain, Mr. Editor, yours respectfully,

Peckham, August, 1863. B. J. M.

We copy this communication from one of our London exchanges, for the benefit of the Bethlehem Railroad Company, on whose surveyed route for a road from Bethlehem there is a bed of peat, which is said to imitate and equal the Irish staple. And as the Lehigh valley is known to abound with the most productive pig-iron furnaces in the United States, it will doubtless follow, if peat possesses the advantages claimed for it for smelting purposes, and if the Moravian peat on the Manochisey be as pure as represented, that *peat* will be added to the fuel list of the Keystone State.—*U. S. Railroad and Mining Register.*

[In addition to the advantages possessed by peat as a fuel, it is also a superior raw material for making gas and oil. Some varieties of it are eminently fitted for this purpose, and if peat "be added to the fuel list of the Keystone State," it will be also classified among the gas-yielding substances produced in that commonwealth.—Ed.]

Davy's Safety Lamp.—The introduction of the Davy lamp was a great event in the history of coal-mining, not as effecting any great diminution of those disastrous accidents which still devastate every colliery district, but as a means of enabling mines to be worked which, from their greater explosive tendencies, would otherwise have been deemed inaccessible. Thus, while the Davy lamp has been of great benefit both to the public and the proprietors of coal, it has been the means of leading the miners into more perilous workings, and the frequency of accident by explosion has, in consequence, not been diminished to the extent which was originally expected. The Davy lamp is a beautiful application of a scientific principle to effect a practical purpose, and with fair treatment its efficiency is indisputable; but where Davy lamps are entrusted to hundreds of men, and amongst them to many careless and reckless persons, it is impossible to guard entirely against gross negligence and its disastrous consequences. In coal-mines where the most perfect system of ventilation prevails, and where proper regulations are, as far as practicable, enforced in regard to the use of Davy lamps, deplorable accidents do occasionally occur; and it is impossible at present to point out what additional precautions would secure immunity from such calamities. The only gleam of amelioration is in the fact that the loss of life in relation to the quantity of coal worked is on the decrease, from which we may infer that it is also on the decrease taken as a percentage on the number of miners employed.

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	3 50	....	....	
1856	AKRON	O.	20,000	33⅓	—	Do.	3,500	3 00	...	..	
1845	ALBANY	N. Y.	25 ,000	20	4	January & July.	65,000	3 00	120	....	None in market.
1858	ALBION	N. Y.	30,000	100	—	Do.	3,000	3 80	....	....	
1851	ALEXANDRIA	Va.	105,530	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	3 00	....	....	
1858	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	3 50	....	....	
1859	ALTOONA	Pa.	40,000	20	4	January & July.	5,000	3 00	....	....	
1859	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1858	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1858	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1855	ATLANTA	Ga.	50,000	25	5	January & July.	12,000	5 00	....	....	
1857	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1850	AUBURN	N. Y.	80,000	50	5	Do.	10,000	7 00	....	....	
1851	AUGUSTA	Ga.	80,000	25	8	Do.	9,000	6 00	....	....	
1853	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	....	
1860	AURORA	Ind.	10,000	—	—	Private Works.	3 500	3 50	....	....	Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1817	BALTIMORE	Md.	550,000	100	5	June & December.	150,000	2 50	150	....	None for sale.
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1853	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	...	...	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.			....	....	
1853	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1856	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	...	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1853	BINGHAMPTON	N. Y.	50,000	50	3½	Do.	10 000	4 00	....	....	
1859	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6,000	4 00	....	....	
1853	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	130,000	2 25	....	....	
1859	BRATTLEBORO'	Vt.	21,000	—	—	Do.	3,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	....	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	35,000	50	2	January & July.	6,000	4 00	....	....	
1859	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1853	BROOKLINE	Mass.	66,000	100	3½	February & August.	3,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.			....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 90	140	125	
1852	BURLINGTON	N. J.	100,000	25	3½	Do.	5,000	4 00	105	....	
1858	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1859	BURLINGTON	Iowa.	65,000	50	—	Do.	8,000	4 00	....	....	
1861	CALAIS	Me.	90,000	100	—	Do.	10,000	3 50	....	....	
1852	CAMBRIDGE	Mass.	300,000	100	5	February & August.	20,000	3 50	100	97½	
1852	CAMDEN	N. J.	300,000	100	3	April & October.	15,000	3 50	105	100	
1858	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	3,000	4 00	90	80	
1856	CANTON	O.	19,000	50	6	March & September.	6,000	3 00	....	....	
1858	CAPE ISLAND	N. J.	80,000	100	—	October.	10,000	6 00	....	...	Watering place.—These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1855	CARLISLE	Pa.	30,000	25	—	January & July.	4,000	4 00	....	...	
1856	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1858	CATSKILL	N. Y.		—	—	Private Works.	3,000	3 00	....	....	
1857	CHAMBERSBURG	Pa.	30,000	25	—	January & July.	3,000	4 00	....	....	Owned by G. T. Sutton
1846	CHARLESTON	S. C.	728,800	25	4	Do.	50,000	4 00	....	..	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	105	.. ..	
1858	CHARLOTTE	N. C.	14,000	50	10	March & September.	3,500	6 00	....	....	
1859	CHARLOTTEVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	....	
1851	CHELSEA	Mass.	100 000	100	3½	January & July.	8,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,300,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.		4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	2 50	....	....	
1859	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	135,000	2 00	128	125	
1860	CITIZENS', READING	Mass.	90,000	100	—				...	....	
	CLARKESVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20 000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	....	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	...	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 60	...	....	
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	3,500	4 00	80	...	Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 00	...	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	...	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1853	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30 000	3 00	....	....	
1853	CONCORD	N. H.	50 000	50	5	Do.	8,000	3 50	....	....	
1858	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28,000	4 00	..	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	...	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	3 000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	5 00	....	...	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	.. .	
1853	DEDHAM	Mass.	40 000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	...	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellent Stock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	3,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,600	4 00	...	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.			....	....	
1857	DOYLESTOWN	Pa.	50,000	—	—	Do.	3 000	4 00	....	....	
1854	DUBUQUE	Iowa.	50,000	115	8½	Do.	17,000	4 50	....	115	This stock is wanted at par.
1853	EAST BOSTON	Mass.	133,000	25	4	Do.	20,000	3 50	....	145	No transactions.
1858	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	...	
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 60	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	3,000	4 00	....	....	
1855	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1852	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	...	
1852	ERIE	Pa.	68 000	50	3½	June & December.	10 000	3 00	....	....	
1838	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	
	EXETER	N. H.	60,000	—	—	Do.	12,000		... ..	...	A very good Company.
	FAIR HAVEN	Ct.	20,000	25		Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	26,000	—	—	Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7,000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	50,000	25	—	Do.	10,000	4 00	....	...	
1857	FISHKILL	N. Y.	10,000	20	—	April & October.	1,500	9 00	....	....	
1858	FITCHBURG	Mass.	100,000	50	3	January & July.	5,000	4 00	....	....	Make Petroleum-Gas.
1859	FLEMINGTON	N. J.	20,000	—	—	Do.	3,000	4 00	....	....	
1855	FLUSHING	N. Y.	20,000	50	1½	March & September.	6,500	4 00	...	....	
1858	FOLSOM	Cal.								....	
	FORT WAYNE	Ind.	40,000	25	—	Do.	6,000	4 00	...	...	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5,500	4 50	...	....	
1851	FREDERICK CITY	Md.	36,000	100	—	January & July.	5,000	6 70	....	....	
18 4	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2,000	4 00	....	..	Unlimited supply of Natural Gas.
1856	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Fremont	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	Fulton	N. Y.	12,000	100	—	Do.	4,000	7 00	....	....	
1855	Galena	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	Galion	O.	25,000	25	—	January & July.	1,800	3 00	....	....	
1858	Galveston	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	Gardiner	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	Geneva	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	Germantown	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	Gettysburg	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	Glenn's Falls	N. Y.	25,000	50	3	February & August.	4,000	4 00	....	....	
1854	Gloucester	Mass.	40,000	50	—	January & July.	5,000	3 50	....	....	
1857	Gloversville	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	Grand Rapids	Mich.	50,000	20	—	Do.	3,000	4 00	....	....	
1855	Great Barrington	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	Great Falls	N. H.	50,000	100	3	Do.	3,000	4 00	....	....	
1860	Greenfield	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	
1853	Greenpoint	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	Close corporation.
1859	Greensboro'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	....	
1858	Greensburg	Pa.	30,000	25	3	May & November.	2,000	3 00	....	....	
1854	Hagerstown	Md.	15,000	20	—	January & July.	2,000	6 00	....	....	
1859	Hamilton	O.	15,000			Do.			....	....	
1857	Hannibal	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1855	Harlem	N. Y.	350,000	50	3½	Do.	25,000	3 00	....	145	
1849	Harrisburg	Pa.	100,000	—	4	Do.	5,000	4 00	....	....	
	Hartford	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	
	Hastings	N. Y.				Do.	8,000	4 00	....	....	Stock in demand.
1853	Haverhill	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1859	Haverstraw	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1861	Hayesville	Mass.	15,000	25		Do.	4,000	4 00	....	....	
1859	Hempstead	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1862	Hoboken	N. J.	100,000	25	3	Do.	30,000	2 50	....	100	
1856	Hollidaysburg	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	Works not yet built.
1861	Holyoke	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1861	Homer & Cortlandt	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1854	Honesdale	Pa.	30,000	25	3	Do.	2,500	4 00	....	....	
1860	Hornellsville	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
1859	Hudson	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
	Hunter's Point	N. Y.									
1857	Huntington	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
1856	Huntsville	Ala.	7,325	25	—	June & December.	2,000	5 00	....	....	
	Indianapolis	Ind.	150,000	—	—	Do.	15,000	5 00	....	....	
1857	Iowa City	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
1852	Ithaca	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	Jackson	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	Jackson	Miss.	80,000	50	—	Do.	4,000	4 50	....	....	
	Jackson	Cal.	50,000	30	—	Do.	4,000	10 00	....	....	
	Jacksonville	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	Jacksonville	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	Jacksonville	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	Jamaica	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1858	Jamaica Plain	Mass.	75,000	100	3½	Do.	3,000	3 50	....	....	
1856	Jamestown	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
	Janesville	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
1853	Jeffersonville	Md.	30,000	25		Do.	4,000	4 00	....	....	
1858	Jersey City	N. J.	300,000	—	5	Do.	30,000	3 00	150	....	No sales since formation of Hoboken Co.]
1856	Jersey Shore	Pa.	15,000	25	—	Do.	2,000	3 70	....	....	
1857	Johnstown	Pa.	80,000	25	3	Do.	8,000	3 00	....	....	
	Joliet	Ill	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	Kalamazoo	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	Keene	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	Keokuk	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	Kingston	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	Kittanning	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	
1854	Knoxville	Tenn.	62,000	—	—	April & October.	4,000	5 00	....	....	Said to be a fraud.
1860	Laconia	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	La Crosse City	Wis.	100,000	50	—	June & December.	10,000	8 00	....	....	
1854	Lafayette	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	Petroleum and Wood Gas.
1856	Lambertville	N. J.	30,000	25	—	Do.	2,600	4 00	....	....	
1849	Lancaster	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	Lancaster	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	Lansinburg	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	Lawrence	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	Leavenworth	Kansas.	200,000	25	—	Private Works.	15,000	4 00	....	....	
1856	Lebanon	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	Le Roy	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	Lewisburg	Pa.	20,000	100	—	January & July.	4,000	4 00	....	....	
1852	Lewiston	Me.	100,000	100	3	Do	10,000	3 20	....	....	
1856	Lewistown	Pa,	30,000	50	3	April & October.	3,000	3 10	....	....	
1858	Lexington	Ky.	100,000	25	4	January & July.	5,000	4 00	....	....	
1853	Little Falls	N. Y.	112,000	25	—	Do.	3,500	7 00	....	....	
1861	Little Rock	Ark.	20,000	—	—	Do.	5,000	6 00	....	....	
1858	Lockhaven	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	Lockport	N. Y.	100,000	50	—	Do.	4,000	4 00	....	....	
1838	Louisville	Ky.	600,000	50	6	Do.	80,000	2 50	125	....	But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1849	Lowell	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	Lynchburg	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	Lynn	Mass.	55,000	50	4	Do.	20,000	4 00	....	....	
1850	Lyons	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	Macon	Ga.	75,160	25	6	Do.	5,000	5 00			
1851	Madison	Ind.	160,000	25	3	Do.	10,100	3 50	....	....	
1855	Madison	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	Malden & Melrose	Mass.	50,000	25	3	February & August.	5,000	4 00	....	....	
1852	Manayunk	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	Manchester	N. H.	100,000	100	5	January & July.	25,000	3 00	....	....	
1830	Manhattan (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	....	....	
	Mansfield	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	Marblehead	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	Marlboro'	Mass.	20,000	—	—	Do.	8,000	4 00	....	....	
	Mauch Chunk	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	Marietta	O.	50,000	50	—	Do.	7,000	4 00	....	....	
1860	Marion	O.	12,000	25	5	April & October.	1,500	3 55	....	....	Stock firm.
1858	Marysville	Cal.	50,000	100	—	January & July.	4,000	12 50	....	....	
1857	Massilon	O.	20,000	25	—	Do.	5,000	3 00	....	....	
1855	Meadville	Pa.	39,500	25	—	Do.	4,000	3 50	....	....	
	Medina	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1852	Memphis	Tenn.	300,000	100	5	June & December.	12,000	3 50	....	....	
	Meriden	Ct.	20,000			Do.			....	....	
1859	Metropolitan (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	Middleboro'	Mass.	15,000	—	—	Private Works.		6 00	....	....	
1853	Middletown	Ct.	50,000	25	3	March & September.	5,000	3 80	....	....	
	Middletown	N. Y.		25	—	Private Works.	3,000	3 00	....	....	Owned by G. T. Sutton.
	Milford	Mass.	20,000	—	—	Do.		4 00	....	....	
	Milledgeville	Ga.	100,000	50	—	Do.		5 00	....	....	
	Milton	Pa.	10,000			Do.			....	....	
1847	Milwaukee	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	Mobile	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1836	Monroe	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	Monigomery	Ala.	100,000	25	4	February & August.	7,000	6 00	....	....	
1856	Montpelier	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1850	Morrisania	N. Y.	30,000	50	—	Do.		4 00	....	....	
1859	Morristown	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	Mount Holly	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	Mount Vernon	O.	50,000	100	—	Do.		4 00	....	....	
1857	Muscatine	Iowa.	50,000	100	—	January & July.	3,000	4 50	....	....	
1854	Nantucket	Mass.	50,000	100	5	February & August.	6,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	P. Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	NASHUA	N. H.	45,000	50	3½	January & July.	10,000	3 50	....	....	
1850	NASHVILLE	Tenn.	200,000	50	5	Do.	25,000	3 50	....	...	
1858	NATCHEZ	Miss.	46,000	50	—	Do.	20,000	5 00	....	...	
	NEVADA CITY	Cal.							....	....	
1852	NEW ALBANY	Ind.	200,000	50	3½	Do.	16,000	3 50	....	...	
1846	NEWARK	N. J.	362,000	50	5	Do.	45,000	3 62	130	...	Always a favorite stock.
1856	NEWARK	O.	30,000	100	—	Do.	7,000	5 40	....	...	
1852	NEW BEDFORD	Mass.	180 000	100	5	Do.	15,000	2 90	102	....	Well managed and kept quiet.
1859	NEWBERN	N. C.	22,000	100	6	Do.	6,000	3 50	....	....	
	NEW BRITAIN	Ct.	30,000	20	5	Do.	3,000	4 00	....	....	
1851	NEW BRUNSWICK	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	NEWBURG	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	NEWBURYPORT	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	NEWCASTLE	Del.	32,300	10	3	Do.	4,000	4 00	90	....	
1847	NEW HAVEN	Ct.	250,000	25	4	Do.	30,000	3 00	155	....	None in market.
1858	NEW LONDON	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	
1835	NEW ORLEANS	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1858	NEWPORT	R. I.	130,200	100	4	Do.	10,000	3 50	112	....	
1854	NEWTON & WATERTOWN	Mass.	300,000	100	2	Do.	10,000	4 00	....	....	
	NEWTON	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	NEWTON	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
1828	NEWTOWN	N. Y.									
1859	NEW YORK	N. Y.	1,000 000	50	5	May & November.	100,000	2 50	300	....	
	NIAGARA FALLS	N. Y.	15,000	25	—	Do.	3,000	4 00	90	....	
	NORFOLK	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1853	NORRISTOWN	Pa.	41 700	25	4	June & December.	8,000	3 50	....	....	
1855	NORTH ATTLEBORO'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	NORTHERN LIBERTIES	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	NORTH ADAMS	Mass.	25,000	—	—	March & September.	30,000	4 00	....	...	
1856	NORTHAMPTON	Mass.	85,000	25	3	January & July.	4 500	4 00	....	....	
1859	NORTH BRIDGEWATER	Mass.	16,000	100	4	June & December.	1,000	7 00	....	....	
1856	NORWALK	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1859	NORWALK	O.	30,000	25	—	January & July.	4,000	4 00	....	....	
1854	NORWICH	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	NORWICH	N. Y.	12,000	50	—	Do.	2,500	4 00	....	...	
1859	NYACK	N. Y.	20,000	100	—	Do.	2,500	4 00	....	....	
1860	OBERLIN	O.	10,000	—	—	Do.	1,200	4 00	....	....	
1855	OGDENSBURG	N. Y.	75,000	50	5	Do.	9,000	4 00	....	...	
1859	ORANGE	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	OSWEGO	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	
1855	OTTAWA	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	Good works, built by Hoy, Jr., & Kennedy
1856	OWEGO	N. Y.	40,000	50	3½	Do.	5,000	4 00	....	....	
1860	OWENSBORO'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	PADUCAH	Ky.	75,000	100	—	May & November	4,000	5 00	....	....	
1861	PAINSVILLE	O.	40,000	25	5	Do.	2,500	5 00	....	....	
1856	PALMYRA	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	PATERSON	N. J.	125,000	25	3	Do.	20,000	3 50	95	....	
1850	PAWTUCKET	R. I.	75,000	50	4	Do.	12 000	3 00	....	....	
1855	PEEKSKILL	N. Y.	81 000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000 May 15, 1863.
1860	PENN YAN	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1859	PEOPLES', CHICAGO	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	
1855	PEORIA	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	What is this Company doing?
1852	PETERSBURG	Va.	120,000	—	5	January & July.	20,000	3 80	....	....	
1841	PHILADELPHIA	Pa.	3,000,000	50	—	City Works.	650 000	2 00	....	....	
1855	PIQUA	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1835	PITTSBURG	Pa.	300,000	100	5	Do.	60,000	1 50	115	....	
1854	PITTSFIELD	Mass.	50,000	100	5	Do.	4,500	4 00	....	...	
1858	PLACERVILLE	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	PLAINFIELD	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	PLATTSBURG	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1853	PLYMOUTH	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	PORT CHESTER	N. Y.	50,000	50	—	Do.	4,000	4 00	....	....	
1860	PORT JERVIS	N. Y.	20,000	100	—	Do.	3,000	4 10	....	....	
1849	PORTLAND	Me.	300,000	50	4	January & July.	30,000	3 00	....	....	
1859	PORTLAND	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1859	PORT LAVACCA	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	PORTSMOUTH	N. H.	70,000	100	8	April & October.	6,500	3 70	....	....	
1855	PORTSMOUTH	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1855	PORTSMOUTH	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1856	POTTSTOWN	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	POTTSVILLE	Pa.	110,000	50	2	Do.	10,000	3 50	....	....	
1850	POUGHKEEPSIE	N. Y.	84,000	25	4	March & eptember.	15,000	3 50	120	110	
1846	PROVIDENCE	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1853	QUINCY	Ill.	300,000	50	4	June & December.	12 000	3 50	....	....	
	QUINCY	Mass.	00,000	00	—	Do.	00,0 0	0 00	....	....	
1855	RACINE	Wis.	43,500	26	—	Do.	7,000	3 50	....	....	
1857	RAHWAY	N. J.	50,000	20	—	January & July.	5,000	4 00	...	....	
1858	RALEIGH	N. C.	25,000	100	6	May & Novrmber.	5,000	6 00	....	....	
1848	READING	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	RICHMOND	Va.	341.975	—	—	City Works.	30,000	3 00	....	....	
1859	RICHMOND	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	{ Jeff. Davis has extinguished the gas-lights of Richmond, Va.
	RICHMOND COUNTY	N. Y.									
1859	RIPLEY	O.	30,000	50	—	Do.	2,000	4 50	....	....	
1852	ROCHESTER	N. Y.	200,000	50	5	Do.	50,000	2 50	....	....	
1857	ROCKFORD	Ill.	40,000	50	—	Do.	4,000	4 00	....	....	
1854	ROCK ISLAND	Ill.	100,000	50	—	Do.	6,000	4 50	....	....	
1854	ROCKLAND	Me.	50,000	100	—	Do.	6,000	4 40	....	....	
1852	ROME	N. Y.	85,000	100	3½	Do.	10,000	3 60	....	....	
1854	RONDOUT and KINGSTON	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	ROXBURY	Mass.	150,000	100	5	January & July.	20,000	3 50	....	....	
1859	RUTLAND	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	SACO	Me.	71,600	100	3½	April & October.	8,000	4 00	....	....	
1857	SACRAMENTO	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1859	SAG HARBOR	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1858	SAINT ALBANS	Vt.	15,000	90	—	Do.	3,000	7 00	....	....	
	SAINT JOHNSBURY	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	SAINT JOSEPH	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1859	SAINT LOUIS	Mo.	600 000	50	—	June & December.	180 000	3 50	....	....	
1857	SAINT PAUL	Min.	200,000	50	3	January & July.	10,000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	SALEM	N. J.	30,000	25	3	Do.	5,000	3 86	....	....	
1850	SALEM	Mass.	200,000	100	4	February & August.	30,000	3 24	...	....	
1859	SALEM	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	SALISBURY	N. C.	14,600	50	6	May & November.	3,500	6 00	....	...	
	SALISBURY MILLS	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	SALMON FALLS	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	SAN ANTONIO	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
1854	SANDUSKY	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1859	SANDWICH	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1852	SAN FRANCISCO	Cal.	2,000,000	100	4½	Do.	100,000	6 50	100	....	
	SAN JOSE	Cal.							....	...	
1858	SARATOGA SPRINGS	N. Y.	39,000	100	—	January & July.	6,000	3 60	70	....	
	SAUGERTIES	N. Y.	30,000	20	—	Do.	4,000	3 00	....	....	
1849	SAVANNAH	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	S. BENEDICTADY	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1858	SCRANTON, Gas and Water.	Pa.	100,000	25	—	January & July.	6,000	3 80	....	....	About trying Water-Gas.
1857	SELMA	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	
1856	SENECA FALLS AND WATERLOO	N. Y.	80,000	50	3	Do.	10,000	4 00	100	....	
	SHREVEPORT	La.	40,000	25	—	Do.	3,000	0 50	....	....	
1856	SING SING	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	SMYRNA	Del.						4 00	....	....	Petroleum Gas.
1860	SOUTH ADAMS	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	
1859	SOUTH BRIDGE	Mass.	5,000	25	—	Do.	4.010	6 00	....	....	
	SOUTH BOSTON	Mass.	200 000	50	—	Do.	60,000	3 25	110	....	
	SPRINGFIELD	O.	900,000	100	—	Do	20,000	3 50	....	....	
1854	SPRINGFIELD	Ill.	75 000	50	—	January & July.	10,000	3 50	....	....	
1848	SPRINGFIELD	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1855	STAMFORD	Ct	6,250	25	5	April & October.	3.000	3 50	....	....	
1857	STATEN ISLAND	N. Y.	150,000	50	5	January & July.	26,000	4 00	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	—	—	Do.	8,000	10 00		....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3,000	4 00	...	....	
1859	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1853	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	3,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1853	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	35,000	3 00	160	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1853	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1859	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1863	Virginia City.	N. T.					20,000				
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1853	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	....	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	3,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	150	148	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	...	
1848	Washington	Pa.	20,000	25	4	January & July.	4,000	8 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wautoma	Wis.	30,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10,000	4 00	....	....	
1852	Westchester	Pa	100,000	25	2½	Do.	3,500	3 50	....	....	
	Westfield	Mass.	25,000	100	6	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.		5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 00	....	....	
1853	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 33	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	3,500	3 80	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1853	Wilmington	N. C.	60,000	50	5	Do.	8,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	36,000	50	6	January & July.	5,000	4 00	....	....	
1861	Windsor	Vt.	20,000	25		Do.	2,000	6 00			Make Petroleum Gas.
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,600	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6,000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	8,000	4 00	....	....	
1854	Yonkers	N. Y.	75,000	50	3½	Do.	6,500	4 00	102½	....	
1849	York	Pa.	40,000	57	3	June & December.	10,000	3 50	....	....	
	Yorkville	S. C.	20,000	25	—	Do.	4,000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6,000	14 00	....	....	
1850	Yreka	Cal.	30,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 00	....	....	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	33 040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2½	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	50,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—	-	February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1848	Halifax	N. S.	160,000	40	7	May.	30,000	3 00	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1848	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1853	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	400,000	40	—	March & September.	110,000	2 80	....	113	Last sale at this figure.
1854	Ottawa	C. W.	40 000	40	5	Do.	5,000	4 50	....	....	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1859	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15,000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	85	4	June & December.	25,000	3 00	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1858	Sorel	C. E.	14,000	20	4	Do.	4,000	3 00	....	....	
1848	Toronto	C. W.	400,000	50	—		50,000	3 33¼	....	....	This Co. pay a quarterly div. of 2 per ct.

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.	—	—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	5 00	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfugos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	5 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	16,000	5 00	....	....	
	Guines	Cuba.		—	—	Do.			....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	35,000		....	....	
	Havana	Cuba.	2,000,000	500	—	Quarterly.	200,000	5 00	....	175	
	Lima	Peru.	100,000	—	—	January & July.	150,000		....	....	
	Maranham (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevideo	S. A	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			....	....	
18 4	Rio de Janeiro	S. A.	1,000,000	500	7¼	Do.	300,000	4 00	...	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	....	
1857	Saint Jago de Cuba	Cuba.	450 000	500	—	Do.	25 000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	....	....	
	Vera Cruz	Mex	500,000	—	—	Do.			....	....	
	Vi le Clara	Cuba.	50,000	—	—	Do			....	....	
	Auckland	N. Z.		—	—	Do			....	....	

ON THE CONSTANTS OF GAS ENGINEERING.

(From the Sanitary Reporter.)

(Continued from page 119.)

In our last article on this subject we showed that where t = cost in shillings for one ton of coal, and c = selling price in shillings for one chaldron of coke, the charge per 1,000 feet gas to pay 8 per cent. on a proper capital should be—

$$\frac{54 + 3t - 2c}{23.25} \quad \ldots\ldots\ldots (1)$$

We also showed that the charge for gas in pence may be expressed thus, where t and c are in shillings, as before: $28 + 15t - c$ ..... (2)

We also quoted a number of towns in which the coke realizes a higher price per chaldron than the cost of the coal per ton. In all these cases we found, as might be expected, that the charge for gas should be remarkably small, the circumstances being so favorable with regard both to the coal and coke.

We found in some of these towns that nearly four times the proper price has been charged for the gas; and however startling these conclusions may be, there is no doubt of their truth, provided we admit the premises which have been previously announced.

We have, within the last few days, received a communication from a valued friend and correspondent, relative to one of these towns, namely, Chatteris, in Lincolnshire. In this communication, we are informed that the price of 2s. 6d. per 1,000 feet, which we have arrived at as the proper charge for gas in Chatteris, would barely pay 5 per cent. on the capital of the company, without allowing anything for the manufacture and distribution of the gas. This statement would lead to the conclusion, that in the Chatteris gas-works the capital on which interest has to be paid amounts to nearly £19 per ton of coal carbonized in the year or, which is the same thing, to more than £2,000 per million feet of gas annually manufactured.

As this is about four times the capital which ought to be employed in the works, it need excite no surprise that 2s. 6d. per 1,000 feet will only pay 5 per cent on the capital. Let the capital be reduced to its proper dimensions, however, and it will be found that 1s. 3d. per 1,000 feet will pay 10 per cent. on the capital, whilst a still lower sum will pay 10 per cent. on share capital, and 5 per cent. on the proportionate amount which is usually borrowed.

Having considered the case of towns which are favorably situate with respect to the prices of coal and coke, let us turn to those in which the price of coal varies considerably. It would extend this article to an unreasonable length to include in the following tables every town from which returns have been obtained. We shall, therefore, content ourselves with giving two tables which comprise extreme cases. The first table comprises towns in which the price of coal exceeds 20s. per ton; and the second, which is the most extensive, comprises towns in which the price of coal is under 10s. per ton.

TABLE

Compiled from recent returns by Gas Companies where the price of coal exceeds 20s. per ton, showing the price at which the gas is charged, and the price at which it ought to be supplied to pay 8 per cent. on a capital equal to £5 per ton of coal annually carbonized.

Name of Town.	Coal per ton.	Coke per chaldron.	Price at which gas should be sold, calculated by formula—28 plus $1.5t - c$.	Price at which the gas is actually sold per 1,000 feet.
	s. d.	s. d.	Per M. feet. s. d.	s. d.
Axminster	25 0	16 8	4 1	10 0
Baldock	20 2	6 8	4 4	7 0
Beaminster	24 0	12 0	4 4	10 0
Blandford	22 6	16 10	3 9	8 4
Crediton	23 0	13 4	4 2	8 4
Dalton	21 0	5 6	4 6	6 8
Deal	21 3	12 0	4 0	6 6
Easthourne	21 0	12 0	4 0	6 8
Godalming	21 6	15 0	3 10	7 6
Hailsham	20 9	18 0	3 6	6 8
Hemel Hempstead	23 0	14 6	4 0	6 8
High Wycombe	22 0	12 0	4 1	6 8
Horsham	20 6	15 0	3 8	5 10
Knighton	24 2	20 0	3 9	8 4
Maidenhead	20 6	12 0	3 11	7 0
Newbury	24 0	15 0	4 1	7 0
Petworth	20 7	24 0	2 11	6 6 to 7 0
Rickmansworth	20 9	12 0	4 0	6 3
Saffron Walden	20 6	18 0	3 5	7 6
Staines	20 6	13 0	3 10	7 0
Average	21 10	14 2	3 11	7 4

TABLE

Compiled from recent returns by Gas Companies, where the price of coal does not exceed 10s. per ton, showing the price at which the gas is charged, and the price at which it ought to be supplied to pay 8 per cent. on a capital equal to £5 per ton of coal annually carbonized.

Name of Town.	Coal per ton.	Coke per chaldron.	Price at which gas should be sold, calculated by formula—28 plus $1.5t - c$.	Price at which the gas is actually sold per 1,000 feet.
	s. d.	s. d.	Per M. feet. s. d.	s. d. s. d.
Ashton-under-Lyne	6 0	4 6	2 9	4 6
Barnsley	5 0	4 0	2 8	3 0 to 4 0
Belper	6 0	8 0	2 5	5 3
Bradford, Yorkshire	9 0	4 4	3 2	4 0
Brighouse	6 9	2 8	3 0	4 2
Bristol	7 6	3 4	3 0	4 0 to 3 9
Bursiem	9 0	4 6	3 1	4 6
Burton-on-Trent	7 8	8 8	2 7	5 0
Calne	9 8	6 8	3 0	5 10
Cardiff	9 0	6 8	2 11	3 6 to 4 3
Carlisle	8 0	4 6	3 0	4 2
Chapel-in-the-Frith	8 0	8 10	2 8	7 0
Chesterfield	7 0	5 8	2 9	5 0
Chippenham	8 0	7 6	2 9	5 0
Cockermouth	9 6	10 0	2 9	5 6
Crewe	6 0	6 8	2 7	7 0
Darlington	8 0	4 0	3 0	4 6
Derby	10 0	8 0	2 11	3 1 to 3 7
Dewsbury	5 9	3 4	2 10	4 2
Durham	6 2	4 6	2 9	4 0
Dukinfield	7 0	3 1	3 0	4 6
Dursley	6 10	2 0	2 6	6 6
Droylsden	8 0	6 0	2 10	5 6
Gomershall	6 3	3 4	2 11	6 0
Halifax	8 9	4 4	3 1	4 0 with dis. down to 20 per cent.
Hartlepool	7 3	4 6	2 11	4 2
Hexham	7 0	3 0	3 0	5 10
Holmfirth	10 0	6 8	3 1	5 0 to 6 8
Horbury	4 8	5 0	2 6	3 9
Huddersfield	7 6	4 6	2 11	3 0 to 4 0
Ilkeston	10 0	8 3	2 11	3 11 to 5 3
Llanelly	7 6	5 8	2 10	5 10
Macclesfield	10 0	4 6	3 3	4 0
Mansfield	9 9	9 0	2 10	4 0 to 6 0
Maryport	9 0	4 6	3 1	4 2
Middlesborough	8 0	6 8	2 10	4 0 to 4 2
Mold	8 6	10 0	2 7	6 8
Newcastle	6 0	2 6	2 11	3 0 to 4 0
Over Darwen	8 9	4 6	3 1	4 0 to 5 6
udsey	8 6	4 6	3 1	6 0
Rotherham	8 3	6 0	2 11	3 4 to 4 7
Selby	10 0	12 0	2 7	6 3
Sheffield	8 6	5 2	3 0	3 0 to 4 0
Shields	7 6	5 0	2 11	4 0
South Shields	5 8	3 0	2 10	4 0
Shipley	8 9	6 8	2 11	5 0 with dis.
Stafford	9 8	8 0	2 11	3 9 to 4 9
Stockton-on-Tees	6 9	6 8	2 8	4 6 with dis. to 15 per cent.
Stoke-upon-Trent	8 7	8 9	2 9	4 6
Sunderland	6 6	1 4	3 1	3 0 to 4 0
Sutton in Ashfield	9 0	9 0	2 9	5 10
Uttoxeter	9 6	15 0	2 4	7 6
Warrington	8 0	5 6	2 11	4 0
Wolverhampton	9 8	10 8	2 8	3 6 to 4 6
Workington	7 8	5 6	2 10	5 0
York	9 0	6 8	2 11	3 3 to 4 0
Average	7 11	6 1	2 10	4 7

The following are the average results shown by these tables, and by the one at page 119:

1. The mean price of gas at seven towns, in which the coke yields a higher price per chaldron than the coal costs per ton, should be 2s. 6d. per 1,000 feet; the average price actually charged being 5s. 9d., or 130 per cent. more than a proper price.

2. The mean price of gas at 20 towns, in which the coal costs more than 20s. per ton, should be 3s. 11d. per 1,000 feet; the average price actually charged being 7s. 4d, or 87 per cent. more than a proper price.

3. The mean price of gas at 56 towns, in which the coal does not cost more than 10s. per ton, should be 2s. 10d. per 1,000 feet, the average price actually charged being 4s. 7d., or 62 per cent. more than a proper price.

It should be observed that the excess of overcharge for these last 56 towns is in reality something more than 62 per cent., because the price on which the present average has been calculated is usually the lowest price, as charged to large consumers.

It is probable, if the average price paid by all consumers could be arrived at, the overcharge would not amount to much less than 87 per cent., as in the case of the first twenty towns.

On the whole it appears clearly that the greatest overcharges are made in towns where the coke commands an exceptionally high price. In other words, it may be said that the consumer does not fairly share in the good fortune of the gas companies, arising from the profitable sale of their residual products.

The two last tables show some curious facts with reference to the relative prices of coal and coke, which may be thus expressed:

1. In 20 towns, where the average price of coal exceeds 20s. a ton, the coke realizes 14s. 2d. per chaldron, or 65 per cent. on the average cost of coal per ton.

2. In 56 towns, where the average price of coal does not exceed 10s. per ton, the coke realizes 6s. 1d. per chaldron, or nearly 77 per cent. on the average cost of coal per ton.

TABLE

Showing the price per 1,000 feet of common coal gas required to pay various rates of interest upon an amount of capital varying from £3 to £8 per ton of coal annually, assuming that the working expenses of gas-making and maintenance exclusive of the raw material, amount to 12s. per ton, and that the sale of old materials, and all residual products, except coke, realizes 2s. per ton.

Rate of interest to be paid on each £100 of capital.	Capital per ton of Coal. £3	£4	£5	£6	£7	£8
£	d.	d.	d.	d.	d.	d.
1	16.4	16.7	17.0	17.3	17.6	18.0
2	17.3	18.0	18.6	19.2	19.8	20.4
3	18.3	19.2	20.1	21.1	22.0	22.9
4	19.2	20.4	21.7	22.9	24.2	25.4
5	20.1	21.7	23.2	24.8	26.3	27.9
6	21.1	22.9	24.8	26.6	28.5	30.3
7	22.0	24.2	26.3	28.5	30.7	32.8
8	22.9	25.4	27.9	30.3	32.8	35.3
9	23.8	26.6	29.4	32.2	35.0	37.8
10	24.8	27.9	31.0	34.1	37.2	40.3

In order to use this table, add the tabular number to one and a half times the cost of coal per ton in shillings, and deduct the selling price of one chaldron of coke in shillings, the remainder will be the price in pence which should be charged per 1,000 feet of gas.

Example.—Required the price which should be charged for gas to pay 8 per cent on a capital of £6 per ton of coal when the latter is 21s. a ton, and coke 15s. per chaldron:

Here the tabular number is 30.3. Hence $30.3 + 1.5 \times 21 + 15 = 46.8$ pence, the price per 1,000 feet which should be charged.

ON THE PRICE WHICH SHOULD BE CHARGED FOR PUBLIC LIGHTING.

No gas company should have anything more to do with this than simply to supply, as much as may be required for the public lamps at a fixed price per 1,000 feet. The whole details of lighting, cleaning, extinguishing, painting, and repairing, should be left in the hands of the local authority, who should provide and erect their own lamp-posts and lanterns, and find the service-pipe from the base of the lamp-column to the burner. Each lamp-column should, in fact, be considered a private consumer, and the company should have nothing to do with it beyond the service-pipe to the base of the post, and supplying by meter the gas required for its consumption.

The price which should be charged by gas companies for gas supplied to public lamps has long been a disputed question, and we have taken great pains to investigate the rate at which it is at present supplied, according to the arrangements now in existence in various parts of the kingdom.

We find, by returns which have been obtained from more than 150 such towns, that, supposing the quantity per hour actually supplied as specified in the contract, and making even less than the company's own allowance for lighting, cleaning, extinguishing, &c., the actual average price throughout the United Kingdom for gas alone supplied to the public lamps amounts to 75 per cent., or three-fourths of that paid by the private consumers.

Considering the large consumption which is paid for by the local authority, usually about one-sixth of the whole supply to a town, the certainty and regularity of payment rendering unnecessary any commission to collectors, the privileges conferred of breaking up the public streets, and the right of laying down mains, we are of opinion that a reduction of 25 per cent. is not too great an equivalent for these services. Indeed, where Parliament has fixed the price for public lighting, as in the cases of Coventry, Huddersfield, and Reading, a reduction exceeding 25 per cent. has been made from the price paid by the private consumer.

However, not to overstrain the case against the gas companies, let us assume that the gas supplied for public lighting is to be supplied at three-fourths of the price paid by the private consumer, and then examine what disturbance this creates in the average price to be paid for the gas.

Put a for the average price of gas, and x for the increased price to be charged to the private consumer in order to make up for a reduction of one-fourth in respect of the public lighting.

Assume also that one-sixth of all the gas is used for public lighting. Then we have this equation:

$$5x + \frac{3x}{4} = 6a \text{ and } 23x = 24a. \text{ Hence } \frac{24a}{23} = x$$

Example.—Let the average price of gas, which must be charged in order to pay the proper dividend, be 4s. per 1,000 feet, required the price which should be charged both to the private consumer and for public lighting, at a reduction of one-fourth, in order to produce in the aggregate the same income to the company

$$\text{Here } \frac{48 \times 24}{23} = \frac{\text{pence}}{50.09} \text{ the price which should be}$$

charged to the private consumer, and, consequently, the price for public lighting should be 37.57 pence, or say, in round, figures, 4s. 2d. for the former, and 3s. 2d. for the latter.

INVESTIGATION OF THE PRICE AT WHICH CANNEL COAL-GAS OUGHT TO BE SOLD IN LONDON.

The chief differences between the manufacture of gas from common and from cannel coal may be thus expressed:

Common coal will yield from 8,000 to 9,800 feet per ton of 12-candle gas.	Cannel coal will yield from 10,500 to 20,000 feet of 20-candle gas.
The products will usually realize half the cost of the coal.	The products will only realize from one-fifth to one-fourth of the cost of the coal.

The capital per ton of coal annually carbonized ought not to be greater for one kind of coal than another.

Proceeding at these data, 10,500 feet per ton of coal may be taken as a moderate estimate for such cannel gas as is made in Lancashire and the metropolis, and the standard value of such gas may be taken at 20 candles. In many of the Scotch towns, such as Edinburgh, Glasgow, Aberdeen, and Inverness, gas of 26 candles is regularly supplied, but we are not sufficiently acquainted with the returns from residual products in Scotch towns to enter on this part of the inquiry. The following calculations, therefore, will apply to gas of 20 candles, by which is to be understood the cannel gas as manufactured by those companies which supply it in the metropolis, and by the cannel gas-works of Manchester, Liverpool, and most other Lancashire towns.

We may here explain that we have distinctly ascertained from our own experiments that the gas-works of Lancashire towns do not supply genuine cannel gas, such as the best seams of Lancashire cannel coal will yield. We have found gas of the best quality, amounting to 25 and 26 candles, at the private mills of Messrs. Ashworth and others, near Bolton. The gas was there made from the Haigh seam of cannel coal, the best on the property of Earl Balcarres. This cannel, in Manchester or Liverpool, is worth nearly £1 per ton, whereas the average cost of the coal used for gas in these places does not exceed 15s. or 16s. per ton. The best gas made in the Lancashire towns, including both Liverpool and Manchester, does not exceed 20 candles, and we ascertained at many of the works that instead of using exclusively cannel coal of the best kind, they used sometimes inferior cannel; and, in other cases, where they used the best cannel, the usual proportion was two-thirds cannel to one-third common coal.

The general result of a great many inquiries and personal observations in Lancashire was this, that the average cost of the coal, whether cannel wholly, or coal and cannel mixed, was about 16s. per ton; that at least 10,500 feet were made from a ton, and that the products realized about 4s per ton of coal, or one-fourth the cost of coal and cannel.

Let us now see what should be the cost of Lancashire gas on these data:

1 ton of coal costing	16	0
Less products	4	0
	12	0
All expenses of manufacture and distribution, including wear and tear, but exclusive of public lighting and meters	12	0
Interest at 8 per cent. on a capital of £5 per ton of coal	8	0
	32	0

This will make ..... 10,500 cubic feet.
Less loss by leakage, condensation, &c ..... 1,750 "
Leaving for sale ..... 8,750 "

$$\text{Then } \frac{\text{s.}}{8750} \frac{22}{} = 3.66 = 3\text{s. } 8\text{d. per 1,000 feet.}$$

Gas is actually sold in the two principal towns of Lancashire at 3s 6d. per 1,000 feet, which shows alike the accuracy of the above calculation, and the extremely favorable circumstances as to capital under which these establishments are placed.

The following detail shows the cost of making cannel-coal gas of 20-candle power in the Metropolis:

	s.
1 ton of cannel coal costs	24.00
Less products, being the yield per ton of coal, according to the Parliamentary account of the Western Gas Company for 1861*	4.87
	19.13
Add all expenses of manufacture and distribution, inclusive of wear and tear, but exclusive of public lighting and meters	12.00
Interest at 8 per cent. on a capital of £5 per ton of coal	8.00
	39.13

Assuming one ton of coal to yield for sale, as in the previous estimate for Lancashire, 8,750 feet, we have $\frac{39.13}{8,750} = 4.47$ or 4s. 6d. per 1,000 feet. This is the price at which the Western Company ought to supply cannel gas in London, and this is the price which would pay the maximum dividend of 10 per cent. on a proper share capital raised in the usual way.

COMMON GAS IN THE METROPOLIS.

Taking the price of Newcastle coal at 16s. per ton, and the selling price of coke at 10s. per chaldron, we have the proper price of 12-candle gas in London, according to the formula which has been previously explained, equal to—

$$28 + 16 \times 1.5 - 10 = 42 \text{ pence, or 3s. 6d. per 1,000 feet.}$$

Comparing the common gas and cannel gas, according to their respective illuminating power of 12 and 20 candles, they are, of course, in the ratio of 3 to 5. Hence, if common gas, of 12 candles, be worth 3s. 6d., cannel gas, of 20 candles, will be worth—

$$\frac{3\text{s. } 6\text{d.} \times 5}{3} = 5\text{s. } 10\text{d. per 1,000 feet.}$$

Hence, as cannel gas could be made for 4s. 6d. per 1,000 feet, there would be considerable economy from using it instead of common gas at 5s. 6d.; in other words, 20-candle gas at 4s. 6d. is considerably cheaper than common, or 12-candle gas, at 3s. 6d.

A considerable discrepancy prevails at the present time between the relative prices of common and cannel gas, for whilst the former is charged 4s. 6d., the latter is only charged 6s. But, according to the relative illuminating power, cannel gas ought to be charged $\frac{4\text{s. } 6\text{d.} \times 5}{3} = 7\text{s. } 6\text{d.}$ per 1,000 feet; in other words, if common gas of 12 candles be worth 4s. 6d., cannel gas of 20 candles is worth 7s.

The preceding calculations, however, show how much in excess are the present prices for both descriptions of gas.

Although the relative illuminating powers of common and cannel gas are in the ratio of 3 to 5, it may well be doubted whether ordinary consumers gain anything like this economy by the use of cannel gas. Some people judge of a gas-light by the size only of its flame, and will insist on burning rich gases with a flame nearly as large as those which are used for common gas. Any approach to this practice of course destroys all chance of economy in the use of cannel gas, and it then becomes, or tends to become, as expensive as the common gas. Owing to defects in the mode of burning cannel gas, it may be seriously doubted whether, to the great mass of consumers, cannel gas at 6s. is any cheaper than common gas at 4s. 6d. per 1,000 feet.

* The Parliamentary account for 1862 shows the receipts for residual products, &c., to have amounted to £6,405, while the coals used seem to have been about 70,000 tons. This gives a yield of 4.74 shillings per ton of coal, or somewhat less than in 1861, but the difference is not sufficient to affect the calculation.

NEW FORM OF CONDENSER.

Mr. J. Brunt, engineer and manufacturer of gas-meters, and M. A. Renaux, manager of the gas-works at Toulon, France, have just invented a new form of condenser or refrigerator to be used in gas-works.

It is well known that before gas is conducted to the purifier, it is absolutely necessary to make it pass through a cooling apparatus, in order to condense the aqueous and tarry vapors which are disengaged from the coal at the time of distillation, and which the liquid of the hydraulic main has not retained or condensed.

This refrigerator is commonly composed of cast-iron pipes placed horizontally, and immersed in water, and sometimes placed vertically, like organ pipes; they are generally situated in a northern aspect, so as to avoid the direct rays of the sun, and are cooled down by the surrounding atmosphere. Sometimes this arrangement of apparatus is immersed also in water or has water frequently thrown over it, but this is rarely the case on account of the large number of pipes.

The gas arriving in large quantity in the pipes of the refrigerator, which can only pass through one pipe after the other, rapidly deposits upon the sides of the pipes the condensing products, and causes frequent obstructions.

Besides, the condensation of vapors would not be complete, as the exterior temperature is not always sufficiently cold, and if the pipes are surrounded with water, and this water is not constantly renewed, it soon acquires the temperature of the apparatus, and the condensation no longer takes place in a suitable manner.

It is this imperfection in the apparatus which necessitates the adaptation of scrubbers in order to prevent the purifier from being charged with condensed matter.

Messrs. Brunt and Renaux have thought of remedying these imperfections in condensers by cooling the gas by a constant current of air, natural or artificial, which current of air would act upon the gas properly divided by the largest number possible of cold surfaces.

For this purpose they have constructed a large cast-iron cylinder, furnished in the interior with a multitude of vertical tubes similar to a steam heating-apparatus; they have placed this apparatus over a well and surmounted it with a pipe which can be attached to the chimney of the works, and thus obtain a constant and energetic draught.

The gas is conveyed into the apparatus by a pipe at the top, and descends and is divided both by the vertical tubes and the spaces that surrounds them according to the interior arrangement for the purpose. It is thus cooled *per descensum*, which is the most natural way, as the coolest part of the apparatus should be necessarily that which is nearest to the ground. Whilst the gas is descending, the condensation of the vapors takes place, and these condensed vapors flow out by a pipe placed for the purpose near the bottom; at the same time the gas passes to the purifiers through a lateral opening also low down in the apparatus.

Should there not be any underground excavation or well, the apparatus may be placed on pieces of stone, leaving spaces between to give access to the exterior air which is drawn up to the top of the apparatus, as the vertical tubes and surrounding space create the draught. Messrs. Brunt and Renaux state that this apparatus is much less costly than the condensers in general use, which is another advantage to be added to those already enumerated.—*Le Gaz.*

PRESENTATION TO A GAS ENGINEER.—Mr. Wm. Cuthbert McDonald, the engineer of the Melbourne, Australia, gas-works, has received a gratifying proof of the esteem in which he is held by his fellow-laborers in the service of the company. At a meeting of the employees of the company, held at the works, Mr. McDonald was presented with a gold watch and chain, accompanied by an address, tastefully written and illuminated on vellum. The address, which was signed by upwards of fifty of the workmen, bore special reference to Mr. McDonald's successful exertions in supplying Melbourne with gas on the occasion of the illumination in honor of the marriage of the Prince of Wales.

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LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

MONDAY, NOVEMBER 2, 1863.

EDITORIAL CORRESPONDENCE.

GAS-LIGHT IN RAILWAY CARS—THE PHILADELPHIA GAS-WORKS.

PHILADELPHIA, Oct. 31st. 1863.

The tourist who is obliged to travel in railway cars by night, is much indebted to those identified with the progress of gas-light, for the great boon of well lighted cars, and the pleasure of being enabled to read with some degree of comfort, and thus to while away the tedious hours when being transported from place to place. The country between Philadelphia and New York, being of a very flat and monotonous character, and totally devoid of attractive scenery, it is desirable to select a night train for making the trip. Although gas-light on railways is nothing new in this country, and our travellers have all experienced the great additions to comfort which this simple innovation secures, yet I always feel like invoking blessings on the man who first introduced it into railway cars.

The mode of lighing cars, adopted on our railroads, is very simple and effective. Compressed gas is used. The reservoirs, which are very strong, and made of cast iron, are placed under the floors of the cars, and the gas is pumped into them under heavy pressure—sometimes as high as 400 lbs. to the square inch. To regulate this enormous pressure, a governor, suitably arranged, is employed, and the gas issues from ordinary fishtail burners. Travellers should be grateful to railway companies for introducing gas into their cars; but they would be still more thankful if a more liberal supply were furnished, and a greater number of burners placed in each car. But, as the companies have made one great stride, perhaps they will soon attempt a farther advance.

As gas-works, wherever situated, offer peculiar attractions, I took the opportunity of visiting the Market street and Point Breeze stations of the Philadelphia Gas Company. At the former of these stations, I had the pleasure of meeting Professor JOHN C. CRESSON, chief engineer, and Dr. C. M. CRESSON, assistant engineer of the company, and I here acknowledge my indebtedness for the courtesy of my reception, and the full and varied information so freely given in reply to my questions. Dr. CRESSON accompanied me through the works, and showed me the results of some of his experiments in wood gas, which, at these works, is now made in great perfection. The limited time at my disposal, prevented me from spending but a few moments at this station, and as my principal object was to see the new works at Point Breeze, I was obliged to hasten through them and take leave of the Doctor much sooner than was desirable.

Point Breeze, which is situated a few miles below Philadelphia, was in former years, a famous place of resort, and on a fine afternoon, the citizens of Philadelphia were wont to drive thither to enjoy the pure and invigorating air from the Schuylkill river, which, but a short distance off, empties into the broader waters of the Delaware. The new gas-works, belonging to the city are located at this place, and are about three miles from the Market street station. They were erected a few years ago, and this site was chosen because of its distance from the built up portions of the city, and also because of its ready accessibility, being directly on the banks of the Schuylkill, and having a wharfage and depth of water sufficient to receive cargoes of coal, lime, etc., direct from vessels.

On driving to Point Breeze, my attention was attracted to the earthworks which were thrown up by the authorities, during the latter part of June, when the rebels were threatening to take Philadelphia, and when they had advanced into the State in large force. The great battle of Gettysburgh altered the views of these gentlemen, and the lesson they there received, taught them the wisdom of returning to their own "sacred soil." The fortifications of Philadelphia were erected under the direction of Gen. DANA, then in command of the post, and the Gas Company of the city contributed the labor of a number of their workmen; and when the ground was broken, Professor CRESSON delivered a patriotic address, which fact was duly chronicled in the columns of the JOURNAL. These earthworks still remain, and they will doubtles serve for many years as silent memorials of the great rebellion, which at one time threatened the very life of the Republic. At present they are in such excellent order, and appear so well adapted for the purpose for which they were built, that they seem out of place amidst the bustling activity of the numerous factories around them, and the peaceful dwellings they were designed to protect.

The most conspicuous object in the vicinity of Point Breeze, is the huge telescopic gas-holder, which is the second in size in the world—one in London being larger. This holder is 95 feet high and 160 feet in diameter. It can be seen for miles around, and forms a very prominent feature in the landscape

The enclosure in which the various buildings belonging to the company are erected comprises over 70 acres. On entering the gateway, the meter-house is the first building approached. It is a beautiful structure, as indeed are all the houses belonging to these works. They are constructed of hewn stone—some of brown sandstone, and others of a greyish material. The architectural proportions of these buildings are elegant, and they are disposed over the large tract of ground in such a manner as to combine utility and taste—essentials too often wanting in public buildings. In the meter-room are two immense station meters, each capable, if necessary, of registering one million feet in 24 hours. Above this room is the apartment where the trustees meet at stated intervals. It is handsomely furnished, and from its elevated position and proximity to the river, it affords a fine view of the surrounding country.

Leaving the meter-house and proceeding to the experimental laboratory, I had the pleasure of meeting one of the assistant-engineers, who politely conducted me through the establishment. The photometer-room adjoins the laboratory. After viewing these, my conductor opened a door leading into a building near by, where stood a miniature locomotive engine, with steam up. We stepped upon the tender of the locomotive, and in a moment were steaming off to visit the various buildings belonging to the works. The coal, lime, and other materials used at these works are all hauled about the yard by these small locomotives, of which there are three, on a railway built with 25 lb. iron, with a gauge of 3 feet. Horse power is thus dispensed with. We were conveyed in this manner to the hoisting-tower, where the lime is raised from the wharf below—a distance of perhaps 50 feet—by hydraulic power. Stepping upon one of the platforms of the hoistway, we swiftly descended to the river's bank, where we walked a short distance to the tower, where coal is hoisted in the same manner. The coal-houses are connected with these hoisting-towers. The cars are run over the roof, through a covered way, and the coal is dropped through shutes made in the roofs of the houses. The coal in falling through the shutes forms long heaps, with a triangular section, the apex of which is nearly coincident with the angle of the roof, a fact which was not lost sight of in designing the houses, and thus saving a vast amount of labor usually expended in storing large amounts of coal.

There are two large retort-houses, each 250 by 50 feet.* In these houses are 96 benches of retorts—all iron—3 retorts in a bench. It is somewhat singular, that notwithstanding clay retorts have been so universally adopted in other gas-works throughout the country, yet at the Philadelphia works, although they have been frequently experimented with, they have never given such results as to justify their adoption. The average duration of iron retorts is here, as usual, 9 months.

Coal-gas is exclusively made at these works. Wet lime purifiers, which were formerly employed, have given place to dry, and a Jones exhauster has replaced Methven's form of exhauster first used. Wooden trays are also used in the purifiers, and they are pronounced decidedly superior to iron in every respect.

My limited time compelled me to shorten my visit to these works, and to take my departure before I had visited all the buildings. Suffice it to say, that they are all on the same scale of magnificence, and they will amply repay one for the time expended in visiting them.

In the laboratory of the Point Breeze Works a number of interesting photometrical experiments have been performed by Dr. CRESSON. Among others, those with the electric light have been most striking. In these experiments not only was the *shadow* of a gas light distinctly shown, but also that of the heated air immediately surrounding the flame.

The district supplied by the Philadelphia Gas-Works is a very large one, being no less than thirteen miles in length. To distribute gas throughout this district, there are four stations—Point Breeze, Market street, Spring Garden, and Manayunk. In these works there is an aggregate of 690 retorts. At the Market-street works, wood-gas is made, which is mixed with the coal-gas made at the other stations. The inequalities of surface in the district of the company present a variation of about 600 feet from the lowest part of the city proper, to the elevations of Chestnut Hill, ten miles above Market street. To equalize the pressure over this great distance, there are governors and storing holders. One large holder is situated on the line of the Germantown Railroad, near the Camac estate; another is on the same road, near Duy's station. A portion of the old district of the Northern Liberties is still lighted by an independent company of that name. The other independent companies existing prior to the consolidation of the city of Philadelphia, have all been absorbed by the municipal company with this single exception. The Northern Liberties Gas-Company still maintain a separate existence, and light a valuable district. Whether they will be per-

* One is 250 by 50, and the other 250 by 52 feet.

mitted to enjoy this monopoly for any length of time depends upon the will of the trustees of the municipal company; for I suppose they can at any time compete with the private corporation, although by so doing consumers would profit but little, for the Northern Liberties Company are popular, and they make a gas of good quality.

The consumption of gas in Philadelphia is increasing in such a ratio as to really cause apprehensions in the minds of the engineers, least a scarcity be felt during the winter months. The calculated demand for December next is in excess of the supply, and the only way for the engineers to meet this demand will be to run the works to their very fullest capacity, and to use high heats and short charges. Philadelphia is probably the greatest manufacturing city in the world, and what with the effects of the war, the high tariff, and the rate of exchange in limiting importations, her factories are taxed to the utmost extent, and running by night as well as by day, they add largely to the consumption of gas. Nor is this all. The influx of Southern Union refugees and other strangers has greatly increased private consumption, so that, between these two causes, the quantity of gas consumed will be largely in excess of former years, and may necessitate extensions in the works.

At some future time, when I revisit this city, I hope to have more leisure to examine the gas works, when I will extend my notes and queries. For the present this must suffice, and I must bring these hasty "pencillings by the way" to a close. C. E. B.

FINANCIAL.

Saturday Evening, October 31st, 1863.

There has been very little movement in gas-light shares since our last report, and a dead calm seems to have succeeded the heavy sales of city gas shares made in the latter part of September. We have no new transactions to note, although quite a number of shares in the *Manhattan* and *Metropolitan*, N. Y., are offered on private terms.

Among other gas stocks now offered, we observe parcels of *Seneca Falls and Waterloo*, N. Y., *Geneva*, N. Y., *Lafayette*, Ind, and a few other companies. The above companies are represented to be in a good condition—particularly the first and last named.

We call attention to the advertisement, in another column, of a gas-works for sale. These works are situated in the immediate vicinity of this city, and in the hands of an enterprising party, they may be made to pay handsomely upon the sum asked for them. The franchise, with exclusive privilege for a long term of years, is very valuable, and we regard it well worthy the attention of capitalists and their gas engineering friends.

PETROLEUM-GAS *vs.* COAL-GAS.—We are requested to state that the article on page 113, in the last number of the JOURNAL, on the subject "Petroleum-Gas *vs.* Coal-Gas," contained the following error: Instead of 155 pounds of wood to the gallon of tar used, and 1 4-5 bushels of charcoal left therefrom, the quantity of wood should have been stated to be 45 pounds, and of charcoal left 7-10 of a bushel.

ANSWERS TO CORRESPONDENTS.

L. S., Jr., of Kansas.—*Much obliged for the information, which, as you will perceive, we have used in correcting our tables. Shall always be glad to have any items of news you may be able to furnish.*

C. P. J., of Ky.—*We believe the works are still in operation, not having heard of anything to lead to a contrary opinion. There was a change in the board of directors a short time before the period you mention.*

A. L. F., of N. Y.—*Your request will be attended to, but we must ask for a reasonable time in which to meet the other party. There will be no serious difficulty about the matter.*

ADVANCE IN COKE.—The New York and Manhattan Gas-Light Companies have advanced the price of coke to six dollars per ton, which is still three dollars per ton less than coal.

CORRESPONDENCE.

THE HAVANA GAS-LIGHT COMPANY.

GUINESS, CUBA, October 10th, 1863.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

Knowing that a few items concerning the gas-works in this part of the world, will prove acceptable, I have obtained the following information relating to the most important company on the island.

La Compañia Española de gas de la Habana, was chartered in 1844, with a capital of $1,250,000, divided into 2,500 shares, of $500 each, with the privilege of increasing the capital to $3,000,000. The capital is now $2,000,000, upon which the company declare dividends every three months, at the rate of about 23 per cent. per annum. The value of the shares in the market, where they can be had, is 75 per cent. premium. There are in use 8,800 meters, and 1,400 public lamps. There are in actual operation 183 retorts, which make 15,000,000 cubic feet of gas monthly. The company have recently introduced clay retorts, and also an exhauster. There are five gas-holders connected with the works, one of them a very fine one, telescopic, made in Glasgow, and erected by Merrick & Sons, of Philadelphia. The capacity of the latter is 400,000 cubic feet. The price charged for gas is $5 per thousand.

The charter of the Havana Gas Company will expire in 1864, and this fact being generally known, the most strenuous efforts are being made to inaugurate a new company, and many promises are being made by the promoters of the scheme, that gas of a better quality will be made, and sold at a lower price than that at which the old company now furnishes it. I think, however, that there is very little prospect of success for such an enterprise. With the protection the existing company enjoy in high official circles, it will be extremely difficult, not to say impossible, to oust them from their present comfortable position. Think of gas being sold at $5 per thousand feet, when it can be made actually cheaper than at the Manhattan Gas Company's works in your city; there being no duty on coal, which is brought here for the most part as ballast!

I wish to ask you what is the best practical book on gas-making? In my humble opinion, Clegg is an old fogy, and of very little practical use.

I cannot close without expressing the great pleasure I receive from reading the numbers of your JOURNAL, as they successively appear. I receive them regularly now, which, a few weeks ago, owing to irregularities of the post, was not the case, much to my annoyance and regret. W.

PERSONAL GOSSIP.

LONDON, October 6th, 1863.

To the Editor of the AMERICAN GAS LIGHT JOURNAL:

Since I had the pleasure of addressing you from Paris, I have passed a fortnight here among the gas-constituents of the metropolis.

The first upon whom I called was Mr. Barlow, editor of the *Journal of Gas-Lighting*. Mr. Barlow is a gentleman of about 55 years of age, of fine presence, six feet in height, with grey hair, and a clear blue eye.

His face has an agreeable expression when in repose, but an acerbity of disposition is too apparent when he talks, to render his society attractive. Mr. Barlow has an unfortunate notion that to succeed in this world he must be at war with every other man, so that his sentiments on that subject emanate rather from a financial policy than otherwise. I should think Mr. Barlow's friendship a desirable thing to possess, while his enmity cannot be of much importance, because he is so entirely a man of impulses that his prejudices, as antipathies, carry but little weight with them. That he is a man of ability no one can question, and I am glad to believe that his *Journal* is a success. His professional business outside of the editing of the *Journal* must be large and remunerative.

Mr. Barlow is particularly "down" on the AMERICAN GAS-LIGHT JOURNAL. He is chagrined at the independence of "Little Jonathan,"—as he once sneeringly termed it—pitching into him in retaliation for his repeated insults and unprovoked attacks. He has been so accustomed to being truckled to by weaker adversaries at home that he cannot brook a blow from abroad. That he has had his punishment for his impertinence to you he does not deny, and he will not be likely to offend again.

Mr. Samuel Hughes, C. E., is, on the contrary, a gentleman of polite address and refined manners. Of a quiet and, indeed, diffident address, Mr. Hughes has all the characteristics of a passionless, resolute, unimpulsive man. He is Mr. Barlow's natural (professional) enemy. His opinions, influence, and skill rank first—far beyond Mr. Barlow's—and he is quite flooded with business, as consulting engineer and referee in the various gas controversies of the day.

It happens not unfrequently that these two gentlemen are opposing counsel in controversies of this character, and it is then that their characteristics are betrayed—the one impulsive, hot-headed, imperious, and impatient; the other calm, equable, patient, unexcitable.

I have visited Mr. Sugg's gas-apparatus manufactory, where the most improved instruments are made; among them Evans' photometer, the demand for which exceeds the ability to produce them.

Mr. Sugg very courteously took me through his establishment, and showed the few kinds of apparatus on hand, the constant requirements of the profession leaving but few in stock. A capitalist could not do better than to invest £20,000 in Mr. Sugg's business, to enable him to extend and increase it; he is an excellent workman, and has a high reputation among business men for probity and integrity.

I called on Mr. George Anderson, C. E., but was so unfortunate as not to find him at home.

Through the politeness of Mr. Hughes I witnessed experiments in the House of Lords with Mr. Gurney's new signal light, which can be seen at a distance of 30 miles, at sea or on land. A full description of this you will receive at another time.

I saw also the working electric apparatus of Mr F. N. Gisborne, electric engineer, for communicating orders of commanders of steam and sailing vessels to the engineers and pilots. A full set of drawings and specifications accompany this letter, to be inserted at your leisure.

I had the pleasure also of an interview with the editor of the *Sanitary Reporter*, the new gas journal in London. It has all the elements of success in its composition, and I am glad to hear that the weekly issue is not found to be too frequent. Without any pretensions, it is steadily gaining ground with the profession and the outside world, and I have no doubt it will meet with deserved success. M.

ADVANTAGES OF ADVERTISING.—As an instance of the advantages of advertising in this JOURNAL, we will state, that our friends, R. D. Wood & Co., of Philadelphia, and the Warren Foundry of New Jersey, lately received an order for *thirty miles of cast-iron pipe* from parties who consulted our columns for the purpose.

ROBBINS' PATENT JOINT FOR GAS AND WATER MAINS.—We would direct the particular attention of our readers to the conspicuous advertisement of Messrs. R. C. Robbins & Co., which appears in another part of this JOURNAL. We have carefully examined into the principles on which the operation of this joint depends, and it is due to the inventor to say, that he has brought forward an improvement of the greatest utility to gas and water engineers, and one for which a universal desire has been long expressed. We can commend this joint with the greatest confidence, and would urge all gas and water engineers to make a thorough examination of its merits. The saving in materials, time, and labor, which its use insures, is very great, when compared with the present tedious and expensive method of laying mains; add to which the fact that this joint can be made *under water* with as great facility as above, its value will be at once appreciated. Those of our engineering friends who have had to waste hours in having the water pumped and bailed out of trenches, preparatory to laying mains, will know how to value a joint which, whether made wet or dry, is at once permanent, tight, and yet which may be deflected some distance without leaking. We cheerfully volunteer this testimony in favor of Mr. Robbins' improvement, for we know what a desideratum it will be to gas and water consumers.

GOSSIP FROM ENGLAND.

In the manufacture and distribution of gas, there are so many things common to all countries and climates, that if they be once thoroughly understood, there is nothing more to be said, or known, about them. But, with many identities, there are also many diversities. Of these latter, so little is known, even by practical men, that they are a frequent source of mistakes and misrepresentations. Take, as a familiar example, the differences in the qualities and properties of coal. The man who has worked only one kind, although he may know all about the varieties of the particular district, will have a great deal to learn by removal to another coal district, or, which is now frequently happening, by the introduction of a coal to a locality in which, previously, it was wholly unknown. In such cases, old notions, and long-acquired habits, have to be given up. The constants of production will be entirely altered. The quantity and the quality of the gas will not be the same; the relative nature and properties of the residual products, will not be the same; and so the whole system of managing retorts and purifiers, will have to be changed. What applies to our coal districts in England, Scotland, and Wales, is even more applicable to the varieties of coal in other parts of the world; and gas-makers will never be able to understand each other, and "compare notes" with any good effect, until they know more about the gas-producing properties of the coal they are using.

The great prosperity which has attended gas operations in this country, during the last few years, is partly attributable to the low prices, and the equability of prices of coal; and which are to be accounted for by the extension and enlargement of railway communication—the vast resources of the Yorkshire, Staffordshire, and Derbyshire coal-mining districts, having now access to London and its neighborhood, and the lines of railway beyond, at remarkably low rates. These facilities for conveying coal with certainty, at fixed prices, and at the times required, have helped to keep down the prices of freights from the northern coal fields of Durham and Northumberland. Other causes have been at work, have left their mark; and their consequences are still felt by the shipping interests. You know that I refer to the strugglings going on in your country. How anxiously are we looking out for the softest whisper of that blessed word PEACE!

The gas companies in London, included in what is now called the Metropolitan district, are indebted for some of their present successes, to "the districting system"—a measure proposed by the companies, and sanctioned by the legislature, in 1860. Under these arrangements, the companies have enjoyed greater quietness than was ever before known; and, whilst each is independent of its neighbor, there is no unfriendly competition. The system works well—the proofs being, higher rates of dividends and lower prices.

Provincial companies, very many of them, are doing as well as those in the metropolis; paying good dividends and reducing the prices of gas.

Gas-lighting is still advancing, making its way into towns and villages, out-lying districts, and detached buildings; and it must advance, for who that has seen and enjoyed it, can ever do without it?

Clay retorts have taken the place of iron. The latter are the exceptions, found only on small stations. Wonderful changes have been wrought by this change of system. At first, it was a slow movement. The clay retort system has had its defects. For many years the disadvantages were so great that it required more than ordinary boldness and perseverance on the part of those who seemed determined to make it succeed. Success came at last; not from any extraordinary improvement in the retorts, but by associating with them the EXHAUSTER. Here is the true secret. Clay retorts would be nothing without—they are everything with—an exhauster. In small stations, where the pressure upon the retorts is not more than four or five inches, clays are used without exhaustion, and the results are satisfactory. With a good engine and exhauster, careful attendance, clay retorts well set and uniformly heated, the perfection of gas making, as to quality, quantity, and regularity, is attainable. "Bad heats," the greatest source of trouble and anxiety to a manager in former times, are now, or at any rate need not be, scarcely known. Clay retorts heat more promptly, retain their heat longer, recover their heat more quickly, and in all other respects are more manageable than iron. There have been no greater improvements in gas-making than are summed up in "clay retorts" and "exhausters."

Meters—wet or dry? The answers are as contradictory, and as strangely marked by inconsistency as they well can be. The old story, "I don't like dry meters," is so often repeated, that it is wearisome to listen to it. No one seems disposed to give a reason why one meter should be as good as another, or why one should be preferable to another. Those who still use wet meters exclusively, offer no valid reasons for doing so; none which have to do with the principle, or the mechanical construction of the instrument. So on the other side, those who have adopted dry meters, seem unable or unwilling to give their reasons for the change. Notwithstanding these anomalies, a great number of dry meters has been sold, and are doing their work well. None but those who have experience of such matters, can understand the difficulties and inconveniences which have resulted from the recent alterations, made compulsory by act of Parliament, in the construction of wet meters. Almost every week, or month, we hear of some new plan for lessening, or removing these difficulties.

"Compensating" meters are made by almost all the manufacturers. Whatever plan be adopted, it will only be a partial mitigation, it can never be an effectual removal of the evil. The range of water-line is too small for hard practice. Simple, accurate, durable, as the wet meter has been, its simplicity and practical and commercial sense, is completely destroyed by making it a philosophical toy, instead of a hard-working machine. No wonder that dry meters have commended themselves; and almost exactly in the same way that wet meters did at their first adoption, more than thirty years ago. The consumers of gas then took the initiative; proving the economy, as well as the other advantages of the meter systems, and this was done long before the companies became favorable to its general adoption. So, also, some thousands of dry meters were in use before it could be seen that the companies, whose customers had purchased them, in reality approved of what had been done.

S. G.

————, England, Sept. 29, 1863.

STILL ANOTHER GAS COMPANY FOR NEW YORK.—At a meeting of the Board of Aldermen, of this city, held on Monday, October 19th, the following resolution was offered:

By Alderman Fox—

Petition of the Directors of the Peoples' Gas-Light Company, to lay mains, etc.

Whereupon he presented the following resolution:

Resolved, That permission be, and it hereby is given to the People's Gas-Light Company, of New York city, to manufacture, supply, and sell gas in the city of New York, and to lay conductors for conducting gas through the avenues, streets, lanes, alleys, and public squares of said city, for a period of fifty years from the date of the organization of said company; said conductors to be laid by said company under the supervision of the Croton Aqueduct Department, and the said company are required to restore the streets opened by them for the purpose of laying such conductors to same condition as before the said conductors were laid.

Which was adopted on a division by the following vote:

Affirmative—Aldermen Fox, The President, Henry, McCool, Reed, Chipp, Mitchell, Ottiwell, Long—9.

Negative—Aldermen Hall, Jeremiah, Masterson—3.

And directed to be sent to the Board of Councilmen for concurrence.

The Board of Councilmen being in session the same evening, immediately concurred in the resolution by the following vote:

Affirmative—Councilmen Hayes, Healy, Keenan, Sandford, Jones, Webster, McVay, Gross, McConnell, Repper, Houghtalin, Haviland, Gaw, O'Brien, Cook, Brandon, Brice, Russell, Joyce—19.

Negative—Councilman McGrath—1.

These large majorities show the tender solicitude the worthy city fathers have for gas consumers in this city, and are far more than enough to carry the measure over the Mayor's veto, should his Honor deem the present companies sufficient for the supply of the people with light.

THE COAL QUESTION IN ENGLAND.

The opening address delivered before the British Association for the Advancement of Science by Sir William Armstrong, part of which appeared on page 109 of this volume of the JOURNAL, seems to have excited the apprehensions of the people of England. It will be remembered by those who read the address, that the speaker dwelt with some degree of emphasis on the duration of British coal-fields, and the wasteful expenditure of fuel. Assuming 4,000 feet to be the greatest depth at which mining will ever be practicable, and that the annual increase on the present consumption will be 2¾ millions of tons, Sir William's deductions were that the duration of the coal-fields would be only 212 years.

The London *Mining Journal* contains some notes on this subject which take quite different ground, and show that the supply of coal will be adequate to the demand for many years to come. We quote from these notes as follows:

It seems in many quarters to have been supposed that when the President spoke of the probable exhaustion in about two centuries he was referring to the coal supply of the whole kingdom, whereas he distinctly limited the remark to the coal-field of Durham and Northumberland, in the immediate neighborhood. As regards the supply from all our coal-fields, the time for exhaustion demanded was much more extended. This every one will allow who is acquainted with the mineral structure of the country. When this subject was brought prominently before Parliament during the debates on the commercial treaty with France, I entered into a series of investigations, which were afterwards published in a work on the British coal-fields, which I fear (to use Coleridge's expression) is to the public generally "as good as manuscript." Nevertheless, I believe the results there stated are incontrovertible. Adopting the limit of depth at 4,000 feet, I found that there was enough workable coal to last, at the rate of consumption for that year (about 71,000,000 tons), for nearly 1,000 years, and, even if the consumption should ultimately reach 100,000,000 tons, that supply could be maintained for 700 or 800 years. But there are many persons well qualified to give an opinion on the subject who maintain that there is no reason why the most valuable seams should not be followed to even greater depths than 4,000 feet. I adopted that depth on considerations connected with increase of temperature and pressure; but it would be highly presumptuous in any one to assert that these physical obstacles cannot be overcome. Already a depth of nearly 1,000 yards has been reached in a Belgian colliery, and coal is now being extracted from depths of 700 and 800 yards in Lancashire. Even with the vertical limit of 4,000 feet I have since found reason to believe that the estimate I arrived at in the case of the South Wales coal-field was rather under than over the truth. In that coal-basin alone, with an area of 906 square miles, I calculated that the rate of consumption for 1859, of 9½ millions of tons, could be maintained for 1,600 years; but it is only right to state that Mr. H. Vivian, M. P., in a pamphlet published by him in 1861, controverts this view, and arrives at the conclusion "that South Wales could supply all England with coal for 500 years, and for her own consumption for 5,000." From this it will appear that whatever error there may be in my estimate, it is not one of exaggeration. As regards the absolute quantity of mineral fuel in this island, it may be considered as practically inexhaustible. The seams of coal outcrop in our coal-fields, and descend under the Permian and Triassic formations to depths exceeding 10,000 feet. The question of the available supply is, therefore, one depending on the rapidity of production and the limit of depth. For the present, however, and for generations to come, the commercial and maritime supremacy of Great Britain is in no danger of being impaired for any want of coal.

Another correspondent writes as follows:

The observations of Sir William Armstrong on the subject of coal, in his recent philosophical address to the British Association at Newcastle, seem to have excited public attention. Accordingly, several letters on the subject have appeared in the *Times*, and, with your permission, sir, I will add another. Coal is a reservoir of force which has been derived exclusively from the sun, and which it has required countless ages

to accumulate. The element in coal of chief importance as a source of heat, and, therefore, of power, is carbon; and that carbon has been abstracted from the carbonic acid originally existing in our atmosphere by plants under the influence of sunlight. Some have supposed that time was when our atmosphere was so strongly contaminated with the poisonous acid that man and the higher animals could not have existed; and some suppose that time will be again, when, owing to the combustion of wood and coal, the same condition will occur. Everything terrestrial is subject to incessant mutation; and everything celestial, too, if faith is to be placed in the observations and deductions of astronomers. Suns have vanished from the firmament, and our own sun may one day shine no more. Speculation is now rife as to the probable duration of our coal-fields, and vague conjectures are put forth which have no solid foundation. We are assured, on the one hand, that these coal-fields are "practically inexhaustible;" and, on the other hand, that in a few centuries, at farthest, our mineral fuel will be gone. The expression "practically inexhaustible" is nonsense, whatever meaning be attached to the adverb qualifying the adjective. The period of exhaustion must come, and perhaps sooner than expected. It will not be in our time, and this so far is a consolation; but no man has sure grounds for predicting the date of its advent. Our copper, our tin, our lead, and our iron are all rapidly disappearing, as well as our coal. And so much the better. We cannot eat our cake and have it. We have reason to rejoice in the abundance of our mineral resources, and our successors will have none to regret their exhaustion, inasmuch as, by their present development, we are laying the foundation of the future prosperity of our race in nearly every part of the habitable globe. Great Britain is not to endure forever in the fulness of her power in one spot, but will hereafter be represented by Anglo-Saxon nations scattered far and wide. The consideration of the waste of coal, both in its getting and consumption, is, I submit, far more likely to lead to important practical results than idle speculations concerning the duration of our coal-fields. That there has been great waste in both, especially hitherto, none can deny. With regard to waste in mining, much might be said. Some time ago the great colliery viewer of the North of England, Mr. Nicholas Wood, asserted that in two collieries alone 160,000 tons of small coal were annually wasted. Now, every ton of that coal contained a nearly equal amount of heat-giving power to a ton of the same coal in lumps; but, under existing conditions, the former cannot be profitably used so long as the latter can be supplied at present prices. Improvements in the arts take place gradually, and from those which have recently been effected in furnaces there is reason to believe that the time is not far distant when every pound of small coal will be consumed with advantage, and pits which are now abandoned as worthless will be worked over again with profit. This has actually occurred in some localities. In South Staffordshire, for example, many of the old "thick coal" collieries have been worked several times over. So long as this small coal is not uselessly and wickedly burnt it will not be wasted, but will prove a valuable inheritance for those who come after us.

While all owners of colliery property are eager to convert their coal into money, and very naturally so, there will necessarily be the fiercest competition, and prices will be low, and so long as prices are low there will be prodigality in the consumption of coal. This cannot be prevented, except by legislative restrictions, which would be as impolitic as unjust to the possessors of real estate. Manufacturers who require much coal will never be driven to adopt improved methods of burning it except by a rise in price. It is only a few years ago when at every blast furnace in the United Kingdom the valuable combustible gas escaping from the mouth was allowed to pass unconsumed and unapplied into the atmosphere, and this is still the case with many; but, owing to competition in the iron trade, and the increased value of labor and materials, this gas is now economized with great pecuniary advantage in many of the largest iron works. In one establishment alone the saving is estimated at 15 cwts. of coal on every ton of pig-iron made. Earnest efforts are now being directed to the economy of fuel in many large metallurgical works; and there can be no doubt that the results will be entirely successful. That the waste of coal in our common fire-places is very large has long since been demonstrated, especially by Count Rumford, about 60 years ago, whose labors, sir, seem to have been forgotten by some of your contributors. His admirable essays on the subject deserve present attention, and might be profitably studied by architects, especially as they contain, in addition, much valuable information on that opprobrium of the profession—ventilation. Perhaps the time may come when cheap gaseous fuel, or even heated air, will be regularly supplied to our houses, and then we may anticipate a smokeless London. This is no idle dream. I will venture to play the prophet, and predict with confidence that it will be done, though I may previously have mouldered into dust. When our coal shall have been all exhausted, peat-bogs will remain; and great things not only may be but are actually accomplished even with this kind of fuel. Peat is extensively used on the Continent for various important metallurgical and other manufacturing operations. The bogs of Ireland may have a glorious future; and our successors in the Emerald Isle may taunt their contemporaries here with the scanty supply of this prime necessity of life.

There may yet remain plenty of coal in the world. Three-fourths of the globe are covered with water, and what geologist shall presume to declare that there are no vast deposits of coal deep below the ocean bed? We have been up and down below the waters several times, and we shall probably sink again; but then the bed of the Atlantic may become dry land, and peopled with our successors. Change is the law of the universe. The moon is stated to be approximating to the earth at the rate of a fraction of an inch in a century or so, and may one day come tumbling upon us. The whole of the solar system seems to be travelling—some report at the slow rate of 47,000 miles an hour—towards an unknown region of infinite space. Great Britain, therefore, has no reason to complain if she shares the common fate of all things, whether in the heavens above or in the earth beneath.

THE MANCHESTER, ENGLAND, WATER AND GAS-WORKS.

We gather from a report of the correspondent of the *Engineer*, that the Manchester City Council has resolved to borrow £100,000 under the provisions of the Public Works Act. This sum will be disbursed as follows:—Ardwick, for roads and sewerage, £30,000; formation of a new cemetery, £25,000; water works, £13,000.

With regard to the water-works, the city council has just authorized the water-works committee to carry out the powers of act an passed last session, relating to various works proposed on the Manchester side of the Godley reservoir, for the purpose of extending and improving the supply of water to the city and neighborhood. The new works comprise a new grating tank, which it is proposed to construct on the easterly side of the Godley reservoir, with conduits and sluices to enable the water to be drawn either from the reservoir or the gauge basin, in order that the supply may not be interrupted, if at any time it should be necessary to empty the Godley reservoir, a main pipe, 30 in. in diameter, to be laid down from the grating tank at Godley, to a reservoir to be constructed on Prestwich Hills. These works are recommended in order to secure, among other results, first, a duplicate means of supply of water to Manchester and the surrounding districts; and, second, the means of supplying more satisfactorily, both as regards pressure and quantity, the high-level districts within and beyond the limits of the city now only inadequately supplied, or which, because beyond the powers of the present works of the corporation, although within the limits of Water-works' Acts, are entirely without water. To show the necessity of securing a duplicate means of supply to Manchester and the surrounding district, the committee state that water can be now supplied only by means of the 40-in. main from Godley to the Denton reservoir, and by the 36-in. main from Denton to Manchester, and by the mains from the reservoirs at Gorton. The 40-in. main is laid down through a very difficult and unsatisfactory country; and in order to avoid accident, to which it is most liable, the main has to be worked with great caution. As the consumption of water extends, the strain upon the main, and with such strain the liability to accident necessarily increases; and such main has been, and so long as it remains the only means of supply, must continue to be, a source of constant anxiety. In case of any accident to the 36-in. main from Denton, the Gorton reservoirs would be the only means of supply to the whole of the city and districts dependent upon the corporation, and, of course, large and most important portions would, from their high level, be left entirely without water. And in case of any serious accident to the 40-in. main from Godley, the whole district would be dependent entirely for supply upon the quantity of water which might happen at the time to be in store in the Denton and Gorton service reservoirs. Independently of the necessity to provide against the interruption of the supply which might arise from accident in case the present works had not been proposed, it would soon have become absolutely necessary to lay down a second main if only for the purpose of enabling the committee to meet the constantly increasing demands for water, as the extent to which the present 40-in. main from Godley can be prudently worked is nearly exhausted, and under any circumstances it would in a short time become necessary either to lay down a second main from Denton, or to stop the further sale of water. The committee have for some time been strongly impressed with the necessity of obtaining power more satisfactorily to supply the high districts in which water is at present distributed by the corporation, and from which complaints, for which there is too much foundation, of the want of water as the consequence of the deficiency of pressure, are from time to time received. It is also necessary to obtain power to give, in case of fires in the higher districts within the city, a greater pressure than can be now afforded by means of the present works. In laying down the new main, it has been endeavored to make it answer both as a duplicate main for supply, in case of accident, to the principal district, and also as a new main to take the water with the Godley pressure into the high level districts which are now either inadequately, or not at all supplied with water. With reference to the reservoir which it is proposed to construct at Prestwich Hills, it will be from this reservoir alone that any water can be supplied to the high level districts, in case of any accident to the new main from Godley (a distance of not less than 14 miles), or of any accident to the present 40-inch main from Godley to Denton, or to the 36 inch main from Denton to Manchester, by which the supply would be interrupted, unless the portion of the new main from Godley to Chancery lane, were used as the duplicate means of supply to the city. In any such event, the whole of the high level districts, which might be supplied by means of the new main which branches at the end of Bradford lane from the new main from Godley, would be without water, if the reservoir at Prestwich were not made and in operation. The reservoir is intended to hold about 23 million gallons of water, while the works proposed will afford a daily supply to such reservoir of 8,937,000 gallons, or about three times the present estimated demand for the high level districts. In case, therefore, of the stoppage of the main for repairs, or of the necessity arising to use the new main between Godley and Chancery lane as a duplicate means of supply for Manchester, this reservoir would continue, during eight days at the least, to meet the present demand of the high level districts. The estimated cost of the works is £131,283 13s. 1d., exclusive of the sum of £5,761 18s. 9d. already paid for the land upon which it is proposed to construct the Prestwich Hills reservoir; and the additional annual charge to the water-works department for interest and sinking fund, will be between £6,000 and £7,000.

The gas supply of Cottonopolis is also a matter of public interest, and we may be excused for referring to it in some detail. It appears that the consumption is canstantly extending. Thus the total numbered meters in use, June 24, 1863, was 38,230, as against 35,520 the previous year, being an increase of 2,710. The average illuminating power of the gas during the past year has been equal to 21.73 sperm candles, consuming at the rate of 120 grains per hour against five cubic feet of gas. The gas rental (including meter rents, £378 11s. 2d.) amounted to £147,422 0s. 5d., as against

£143,310 9s. 6d. the previous year, being an increase of £4,111 10s. 11d., although the revenue of the past year had been diminished to the extent of £4,800, or thereabouts, in consequence of the reduced charge for gas supplied to the street lamps having been in operation for the first time during the entire year, and by the first half-year of the last reduction in the price to consumers within the city. The gross profit amounted to £55,804 12s. 9d., as against £42,667 7s. 1d. the previous year, being an increase of £13,137 5s. 8d. After payment of interest amounting to £14,932 17s. 8d., and transferring to capital account the sum of £18,609 17s. 4d. towards liquidation of the mortgage debt, the balance to be paid over for improvement purposes amounts to £22,261 17s. 9d. During the past year the committee repaid loans amounting to £26,825, against which the sum of £7,163 1s. only has been borrowed, making a net reduction of £19,661 19s. in the amount owing on mortgages. They also redeemed, at twenty years' purchase, amounting to £9,871 10s., the chief rent of £493 11s. 6d. per annum, charged upon land which forms part of the site of the Rochdale Road station; making a total reduction during the past year of £29,533 9s. in the amount of liabilities on capital account. The expenditure on capital account during the past year amounted to £13,500 17s 2d. The committee having ascertained the sources whence the increase of profit during the past year has been derived, and having carefully considered the question of their permanency, recommended to the council the adoption of the following reduced scale of charges after the 25th of December:

	Within the city.	Beyond the city on the Lancashire side of the river Mersey.
When the quarterly consumption is under 500,000 cubic feet	3s. 6d.	4s. per 1,000
500,000 and under 1,000,000 cubic feet	3s. 5d.	3s. 11d. "
1,000,000 cubic feet and upwards	3s. 4d.	3s. 10d. "

The amount represented by the proposed reduction is estimated at £8,750, one-half of which (£4,375) and £4,600 in respect of reductions already authorized, making together the sum of £8,975, will operate in reduction of the revenue of the year ending 24th June next. The committee, however, anticipate that, as the result of arrangements recently entered into, a considerable saving in the cost will be effected during the current year; which, together with the profit to be derived from increased consumption, it is expected will be almost, if not fully, equal to the amount of the reduction recommended.—*Sanitary Reporter.*

CLAY RETORTS.

On page 122 of our last number, we printed a paper on the results of the use of clay retorts for gas making, which was read before the Institution of Civil Engineers, by Jabez Church, Esq. After the reading of the paper the following discussion took place on the subject, the importance of which will be recognized by every gas-engineer.

Mr. Henry Gore said, in discussing the merits of clay retorts, the question of fuel was a matter of serious importance. He would, therefore, mention a few circumstances connected with the description of fuel used, as well as the apparatus employed in the process of carbonizing. He had had opportunities of obtaining practical information with regard to the use of clay retorts in seven or eight gas-works situated in different parts of the country, involving the use of almost as many varieties of coal. In Leeds, the coal used for the manufacture of gas, was a kind of bastard cannel, found in the neighborhood of Wakefield and Dewsbury, mixed with about one-third of the ordinary soft coal of the district. With the ordinary iron retorts, the maximum amount of gas obtained, was from 7,600 to 8,000 cubic feet per ton. About 37 per cent. of the coke was consumed for fuel. The gas produced had an illuminating power of 17 sperm candles. Since the introduction of clay retorts, the average make of gas was from 9,100 to 9,200 cubic feet per ton; and he believed that result—considering the specific gravity of the gas delivered to the public—was satisfactory. But the fuel used in producing that quantity of gas amounted to about 60 per cent. of the coke that was made. London engineers would probably characterise that as a wasteful and negligent process of manufacture; but it must be borne in mind that the fuel they had to deal with in Leeds, was totally different in character to that employed in gas-works in London, and in the southern counties generally. The coke itself was light and friable, and contained a large proportion of earthy matter. To keep up a heat in clay retorts, equal to the production of the quantity of gas per ton that he had mentioned, they were obliged to have recourse to what might be technically termed hard firing, and a much greater draught was essential than was necessary in London and its neighborhood. As a striking contrast to the circumstances just related, he might allude to the carbonizing process at Doncaster. The coal used in the gas-works there, was chiefly from the Darley Main, mixed with a portion of the Silkstone seam, from the Thorncliffe collieries, belonging to Messrs. Newton and Chambers. This mixture, at a fair working heat, and with six-hour charges, produced about 9,400 cubic feet of gas per ton, of the average specific gravity of 420, and having an illuminating power equal to fourteen and a half candles, whilst they could sell from the yard nearly 75 per cent. of the coke that was produced. Before, therefore, the economy of clay retorts could be satisfactorily settled, all the conditions affecting the question, both as to the material to be employed, and the form of retort to be used, must be taken into consideration. Another important point was the mode of setting the retorts. The general plan in London, and its neighborhood, was to set them in beds of five or seven, and in some cases beds of eleven retorts with one or two fires. No doubt that arrangement was applicable to the nature of the fuel which was obtained in the locality, but in Yorkshire it would entirely fail. At Doncaster, he found that he could work the retorts set in beds of five retorts, with one fire, with a satisfactory result, as to the heating power of the furnace; but the wear and tear of the furnace itself was excessive. The same class of bricks that in London would last from twelve to fifteen months, at Doncaster would be destroyed in seven or eight months. This necessitated an arrangement of setting that would offer facilities for renewing the furnace without destroying the retorts. By a mode of setting he had adopted, the entire furnace could be reconstructed at a cost of about thirteen shillings per bed of five retorts. At Lancaster, this arrangement was a failure; there the bed of five retorts required two fires, or double the furnace space; but the heat was so much increased, that instead of 9,600 cubic feet of gas per ton, the produce was nearly 11,000 cubic feet per ton. The fuel employed at Lancaster, was Wigan Cannel, mixed with a small portion of the black coal of Manchester. The average illuminating power of the gas, was twenty-one sperm candles. In order to the determination of this important question, the practice and experience of different localities should be amalgamated; so that, instead of having extraordinary statements as to the results obtained at one end of the country, which were not applicable to other places, they might gain a little from each, and thus benefit the general public.

Mr. A. Wright said, the author of the paper had pursued an extremely cautious course in dealing with this subject. He had gone over the history of the introduction of clay retorts, and had stated the advantages derived from their use, with a great degree of moderation. It had been stated, that at Leeds the ordinary iron retorts produced an average of about 7,600 to 8,000 cubic feet of gas per ton of coal, whilst from the clay retorts an average production of 9,100 to 9,200 cubic feet was obtained. This appeared to be at variance with the results given in the paper, in which it was said that the produce was about the same in both cases. Mr. Wright's experience tended to confirm the latter opinion, and he could not, therefore, endorse the statement, that the use of clay retorts resulted in an increased production of 1,500 or 2,000 cubic feet of gas per ton of fuel. Under particular circumstances that favorable result might be obtained, but he did not think it could be relied on in general working. The quantity of gas produced from any description of coal, depended upon the amount of heat applied. An iron retort being thinner, and having, therefore, less heat than a clay retort, cooled down to a greater degree when putting in the charge of coal; and it was some time before it got heated up again to the best state to eliminate gas. Clay retorts being thicker, and having a greater amount of heat in reserve, were not so much reduced in heat when being charged, and were better fitted to eliminate the gas than iron retorts. At the same time clay was, to a certain extent, porous, whilst iron was comparatively impermeable to gas; so that, although a large quantity of gas was eliminated in the former case, he did not think any more passed into the gas-holder. He had given some attention to the question of the leakage of gas from retorts under pressure, and had ascertained that the leakage was in the direct ratio of the pressure. It was difficult to account for that, the general law of the passage of gas through orifices being, that the leakage was as the square root of the pressure. If an orifice, as, for instance, a gas-burner, was made in a pipe, and a pressure of a column of water of one inch was put on, it would deliver a certain quantity of gas; whilst to deliver double that quantity of gas, a pressure of four inches would be required. He had tried the experiment, and found it to be so. That law was generally relied on, but with clay retorts at a high heat, he had found that the leakage increased directly in proportion to the pressure. The author had stated that up to seven inches pressure, clay retorts might be worked economically. In this Mr. Wright agreed; but when they went to twelve inches pressure, the excess of quantity eliminated was more than compensated for by the permeation through the pores of the retort. In a large number of towns, the gas-works were not sufficiently extensive to admit of the use of the somewhat costly process of exhaustion. In such cases, he had found that iron retorts had considerably the advantage over clay retorts, and he apprehended that it might be taken as a rule, that where a less number than ten retorts were employed, the ordinary iron retort, seven feet six inches long, would be more economical than clay retorts. This would, however, be effected to some extent by the price of coal and coke in the district. If coal were cheap, and coke sold at a good price, the latter product would compensate for the leakage in clay retorts. At the Western Gas Company's works, he had substituted clay retorts for iron, and at the present time he had not one iron retort at work. It was with some hesitation that he had adopted the change of system, because when gas was made at a particularly high heat, bisulphuret of carbon was given off. Now, it was necessary that clay retorts should be worked at a much higher temperature than iron; and so soon as it was attempted to distil coals at a very high temperature, a large amount of this bisulphuret of carbon was produced. That was the main reason which caused him to delay the introduction of clay retorts, and even now he did not work them at the high heat which was regarded as the most economical. The quantity of the bisulphuret of carbon might be represented as varying from 1 to 5, the sulphuretted hydrogen being 40; that was, gas could be made so bad, from the presence of the bisulphuret of carbon alone, as to be equal to from one-fortieth to one-eighth of the ordinary impurity of gas before purification. Yet, by the usual tests, it would not be detected, and it was not until it was burnt in a room that it would be discovered. He agreed with the author that the first cost of erection of clay retorts, was only about half that of iron; and that the clay retorts would last for 2½ years, whereas iron would not last more than twelve months; but the author had omitted to state, that when the retorts were made through and through (both ends open), there was less carbon deposited, and less fuel used. He considered that the saving in the manufacture of gas from the use of clay retorts, was three pence per 1,000 feet. With this, he begged to couple the observation he had already made with regard to the impurity introduced into the gas from working at very high temperatures.

(*To be continued.*)

New Rochelle, N. Y.—Gas-works are nearly completed at this place. They are being built by Mr. Mark Levy, of this city, who will use his patent apparatus for producing wood gas. We are informed that the prospects of the company at this place are good, and that they will commence operations with about 100 consumers.

PATENTS.

UNITED STATES

40,050.—C. H. Kupfer, Hoboken, N. J., for a Lamp Burner:

I claim, first, The arrangement, within a burner, of a fluted cone F, constructed and operating substantially as set forth.

Second. The deflecting cap, G, when provided with a contraction, h, at about half way of its height, but whether with or without the perforations, m m, the whole constructed and operating substantially as described

Third, The combination with said fluted cone, F, of the perforations, b b, operating as specified.

Fourth, The combination of the fluted cone, F, the cap, G, contracted as described, and the perforations, b b, the whole constructed and operating as above mentioned.

Fifth, The arrangement set forth for attaching the cap, G, to the body, A, of the burner, so as to form an air-space, q, to diminish the conduction of heat to the oil reservoir.

40,058.—E. L. Norfolk, Salem, Mass., for a Device for Supplying Gas-Retorts with Liquids:

I claim maintaining a regular supply of hydro-carbon for gas purposes by means of the chamber, A, and connecting-pipes, E and F, or their equivalents, the whole operating in the manner and for the purpose set forth.

40,062.—F. D. Prudhomme, Paris, France, for a Pump:

I claim, first, The combination of two pumps, one being a lift and the other a force pump, arranged as herein shown, or in any equivalent way, to operate conjointly in the manner as and for the purpose specified.

Second, The particular construction of the lift pump as herein described, to wit, two solid pistons of equal size fitted in a cylinder divided into two compartments by a fixed partition, forming a resisting surface to the action of the water as described.

Third, The combination of the cylinders, M A A', pistons, P B B', pipes, F' J J', and valves, D D' d d' L L', all arranged and operating substantially as set forth.

Fourth, The described arrangement and combination of parts constituting the double-acting driving pump without valves, but with a solid piston transmitting motion to the lift-pump pistons through continuous columns of water, whereby the use of a rod extending down the well, mine-pit, or shaft, is dispensed with.

40,068.—R. N. Warfield, Rochester, N. Y., for Deodorizing Petroleum, Naphtha, &c.:

I claim deodorizing petroleum, naphtha, &c., by the introduction of a volume of steam into the liquid beneath its surface, by means of the pipe, C, and drum, B, or in an equivalent manner, so that the steam is distributed throughout the contents, and removes the gas by its passage through the oil, substantially as herein set forth.

I also claim passing the steam through the box, E, or its equivalent, containing chloride of lime, muriate of ammonia, and stone lime, so that the steam becomes impregnated with the principles of those elements prior to entering the oil, for the purpose of further purification, substantially as specified.

40,080.—A. C. Ketchum (assignor to Wm. P. Pettingill & S. T. McDougall), New York City, for a Coal-Oil Lamp:

I claim, first, The application of the partition or cross-bar, E, to the tube, B, and base, a.

Second, I claim the peculiar mode of attaching the jacket, D, as shown in Fig. 1.

Third, I claim the combination of the jacket, D, with the partition, E, and attached to the tube and base, B and A, substantially as described, thereby making a simple and economical burner.

40,085.—Addison Smith (assignor to himself and James M. Sayre), New York City, for a Gas Compensator:

I claim, first, Combining with a cylinder provided with ports and a valve mechanism substantially as described, the inverted cup and fluid joint for operating the valves and regulating the pressure of gas, substantially as described and set forth.

Second, The combination with an inverted cup and fluid joint of a double valve, whereby a small movement of the inverted cup causes the valve to give increased communication between the pipes, and thereby more quickly and evenly regulates the pressure of gas, substantially as described and set forth.

40,094.—M. B. Dyott, Philadelphia, Pa., for Lamp:

I claim a lamp made with a drip-trough depression, b, at its neck, and a handle depression or indentation, C, at its side, with attached handle, , therein, all as herein shown and described.

30,119.—Isaac A. Pinnel, Galva, Ill., for a Water Elevator:

I claim the forked hand-lever, E, and brake, f, in combination with the drum, A, and wheels, C and D, constructed and operating in the manner and for the purposes herein shown and described.

40,125.—Orlando Shepard, Rochester, Ohio, for a Water Elevator:

I claim the double cone, C C, of the windlass, with the double rope, F F, and pulley, E, when constructed, arranged and operating substantially as and for the purpose set forth.

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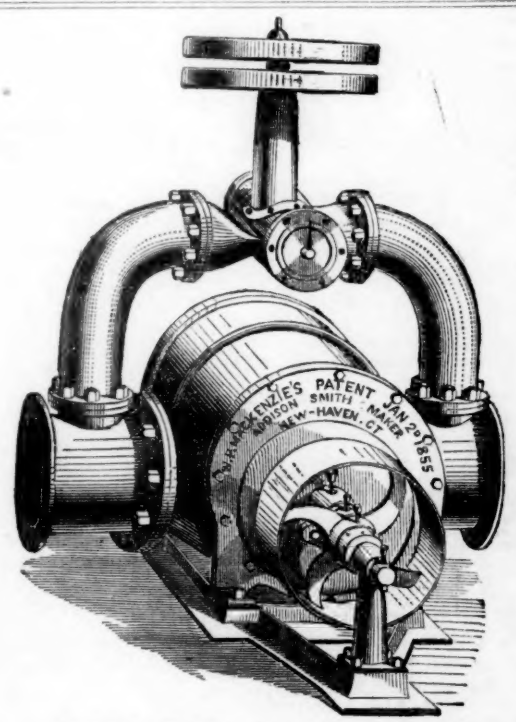

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ALEX. BRANDON, JAMES MURRAY, RICHARD O'BRIEN. } Committee of Lamps and Gas.

THE COMMITTEE ON SEWERS of the Board of Aldermen will meet EVERY WEDNESDAY, at 2 o'clock P. M., in room No. 8, City Hall. Parties interested in any matter before the Committee will have an opportunity of being heard.

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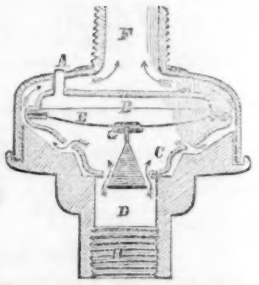

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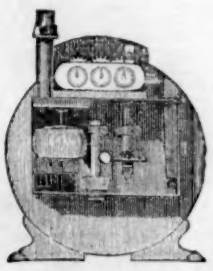

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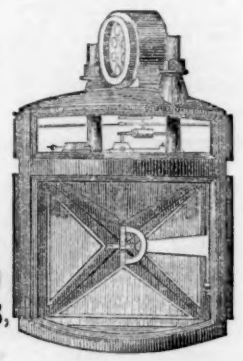

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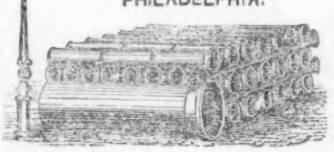

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Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

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Gratis and post free, "The Inventor's Manual," also a pamphlet, "L'Obtention de Patentes Anglaises," 500 Mechanical Movements; the first part of Kinematics, or the Transformation of Motion, by Joseph Willcock, C. E., Mem. Soc. of Eng. May be had at the above address, and of any bookseller. Price 2s. 6d.

The second part is approaching completion and will shortly be announced.

NE-PLUS-ULTRA WATER, GAS, AND STEAM JOINT,

R. C. ROBBINS, Inventor and Patentee.

THE PROPRIETORS of this unrivalled joint are now prepared to introduce it to general use, and to guarantee that, in all respects, it will fulfil perfectly all the requirements of either water, gas, or steam. It is a joint which remains in all situations absolutely tight.

The following illustrations, with the appended explanations, will give a good idea of the improvement:

Fig. 3.

Fig. 1.

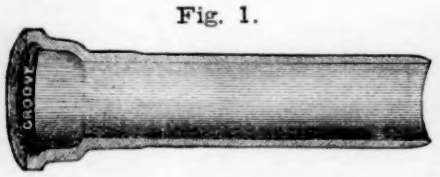

Fig. 2.

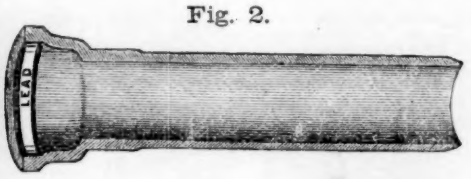

Fig. 4.

FIG. 1. Is a sectional view of a pipe showing a groove to receive a lead ring.

FIG. 2. Is a sectional view of a pipe showing a lead ring in the groove.

FIG. 3. Represents a former, which is used in the bell end of the pipe while casting the lead ring. Before using the former, however, a strip or belt of India rubber is first inserted in the socket, against which the former rests to prevent the lead escaping from the groove while being cast. Upon the cooling of the lead, the former and rubber ring are withdrawn from the socket, and the lead ring is left projecting inwards from the groove all around, forming an indestructible packing to receive the spigot-end of the pipe.

FIG. 4. Shows two pieces of pipe in connection with an hydraulic jack, by which the spigot-end of the pipe (which is cast tapering and may be cast in a chill), is forced into the lead ring in the groove which perfects the joint. A, represents the jack; B, B, the chains by which the pipes are drawn together; and C, C, pieces of pipe.

This ring joint packing may be cast at the foundry or any convenient place, and when delivered at the ditch, may be laid, and perfect joints formed, by any laborer, above or below the surface, or in ditches filled with water, there being *no joint ditching required*, and it can be laid with very great rapidity.

Among the economies realized by this joint may be enumerated, the saving in the weight of the pipe, in the amount of lead required to be used in forming the packing, in the labor of ditching, and in laying the pipe.

The bell or socket may be cast one-half the usual length, as the width of the groove requires, but from a half to one and a half inches, according to the size of the pipe, thus saving in the total weight about two hundred pounds per ton.

The weight of lead required to form this joint, as compared with the amount of lead used in forming a joint according to the old method, is fully seventy-five per cent. less, only so much being required as to maintain the compensating principle, or enough to allow (upon the raising or depressing of the line of pipe out of a direct line) what is lost upon one side of the ring packing, to take its place upon the other; thus securing flexibility of the joint without affecting its reliability. The use of yarn or hemp packing is dispensed with, the cost of which is an entire saving as compared with the old method of making joints.

The saving of labor in ditching is the total amount usually expended in digging joint-holes, there being *no joints to be caulked.*

The saving in labor in laying pipe furnished with this joint is a sum equal to the whole cost of carrying lead, fuel, ladles to the ditches, casting the lead, bailing out water, and the entire labor of caulking, less only the sum charged for casting the lead ring packing at the foundry, which is comparatively trifling. This last-mentioned economy has been estimated by the best engineers at seventy-five per cent., or the same as the saving in the quantity of lead used.

The cost of pipe cast from our patterns is the same per ton as pipe cast for the old form of joint. The principal iron-founders propose to charge the same price.

We have submitted these joints in water-pipes to a pressure of two hundred and fifty pounds to the square inch, and they have remained perfectly tight. It has also been submitted for months in gas-pipes to the ordinary pressure of our city gas-mains, without any leakage whatever. We are aware that these statements may be deemed by many extravagant, but the merits of the improvement warrant them all, and the most skeptical may be fully convinced by an investigation of its value, and by witnessing the tests to which we submit it, or by its use under any conceivable circumstances.

For further information, or for prices and terms, which will be very reasonable, apply to

R. C. ROBBINS & CO.,

No. 197 GREENWICH STREET, NEW YORK.

OFFICE OF THE WATER COMMISSIONERS,
CITY HALL, JERSEY CITY, October 14th, 1863.

Dear Sir,—On the 26th of May last, about two hundred and sixty feet of cast-iron water-pipes, six inches in diameter, with joints constructed according to your invention, were laid for the Jersey City Water-Works, in Prospect street.

The operation of uniting the joints of the pipes, was performed with remarkable facility, and with an important saving in time, materials, and labor. The joints proved perfectly water-tight, after turning the full head of water on the pipes.

In my opinion, your invention has proved entirely successful, and will be found highly beneficial to water companies.

Yours, respectfully,
ROBT. C. BACOT,
Superintendent and Engineer, Jersey City Water-Works.

MR. R. C. ROBBINS.

ENGINEER'S OFFICE, CROTON AQUEDUCT DEPARTMENT.

Dear Sir,—I have examined your plan for making joints in cast-iron water pipes, and have a report from one of my assistants, of certain experiments made by you, to prove the certainty and economy with which the joints can be made, and their stability when finished.

I think the experiments showed that the joints could be made quite as rapidly, if not more rapidly, than those made in the ordinary method now in use; the quantity of lead used was less than that required in the common joint, and no yarn packing was required. In these respects, your joint seems superior.

After the joints were made, a pressure of three hundred pounds to the square inch, was put upon the pipe in such a manner as to test the efficiency of the joint to prevent both leakage of water, and separation of the pipes from each other longitudinally. This pressure failed to produce either leakage at the joint, or separation, so long as the pipes lay in a direct line; but on deflecting them six and a half inches, in a length of twelve feet, the joint commenced leaking. It is fair to add, that this is a greater deflection than would often be found necessary in laying pipe.

I think the efficiency of the joint in both the points tested in this last experiment, might be increased by increasing the quantity of lead, both in thickness and width.

Altogether, the result of the experiments was such that I have determined to make a more thorough test of your invention by putting down about one thousand feet of pipe, when we commence our operations for the coming season.

The diameter of the pipe subjected to experiment, was six inches, and is the same size that I propose to put down next year.

I am, very respectfully, your obedient servant,
A. W. CRAVEN, Chief Engineer, &c.

To R. C. ROBBINS, Esq., Jersey City.

METROPOLITAN GAS-WORKS,
ENGINEER'S OFFICE, NEW YORK, October 9th, 1863.

Dear Sir,—The undersigned had the pleasure of being present at an experimental test of your patent joint for gas and water pipe, made at the yard of the Croton Aqueduct Department, and cheerfully testify to the results obtained, namely:

First experiment was made with two lengths of eight-inch pipe, jointed together, when a pressure of three hundred pounds to the square inch was applied. This pressure did not force the pipe apart, nor start the joints, but they remained, during this experiment, perfectly tight.

Second experiment was made by deflecting the pipe five inches, which is about equal to eighteen inches in one hundred feet, and the same pressure applied, which caused a small leak at the joints.

Third experiment was made by taking the pipes apar and rejointing them, when the same pressure was applied when lying straight and when deflected; at this experiment there was no leakage.

From these severe tests it is my impression that the superiority of your patent joint has been made manifest, and that it must eventually supersede the old way of jointing pipes together, saving both time and material.

Wishing you success in your enterprise,

I am, very respectfully, yours, &c.,
AMBROSE J. WHITE, Engineer.

To R. C. ROBBINS, Esq.

OFFICE OF THE METROPOLITAN GAS-LIGHT COMPANY,
NEW YORK, October 9th, 1863.

Dear Sir,—Having been present at the testing of your patent joint for gas and water pipe, at the yard of the Croton Aqueduct Department I can testify to the results as stated by Col. A. J. White, and fully concur with him in the opinion expressed in his letter to you of this date.

Very respectfully, yours,
W. TITUS, Secretary.

R. C. ROBBINS, Esq.

NEW YORK, October 23d, 1863.

Gentlemen.—I am pleased to be able to inform you, that we are fully satisfied that we have done well in adopting your "Improved Joint" in the construction of an aqueduct which we are now building on Oil Creek, Northwestern Pennsylvania.

We have ten miles of three and four inch pipe to lay this season, and, in our estimation, the perfection of the joint, economy in lead, and rapidity with which the pipe can be laid, render it entirely preferable to any other method of laying pipe.

Our Mr. Hutchings advises us that he is putting down the three and four inch pipe at the rate of twenty-five to thirty lengths per hour, with two men in the trench. We are much pleased with this result.

Respectfully yours,
HUTCHINGS & FOSTER.

Messrs. R. C. ROBBINS & Co.